SEPTEMBER 1982
75p

COMPUTER & VIDEO GAMES

OWL
THE BBC MICRO MAGAZINE
ISSUE TWO INSIDE

TRON
Inside a game looking out

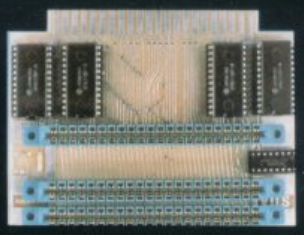
Games listings for the Atom, Pet, Atari, ZX81, Spectrum and many more

WIN A BALLY PINBALL

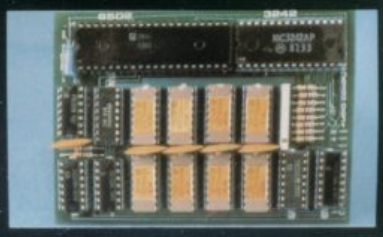
MORE MEMORY FOR MICROS!

look at what we can offer:

RAMPACKS
for SINCLAIR ZX81

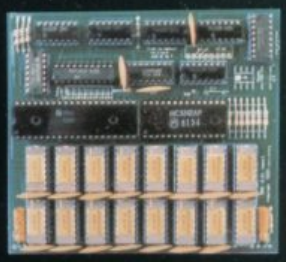


VCS 8K for VIC
8k RAM + 3 slots **£44**



DUO1 for ATOM
64k RAM only **£70**

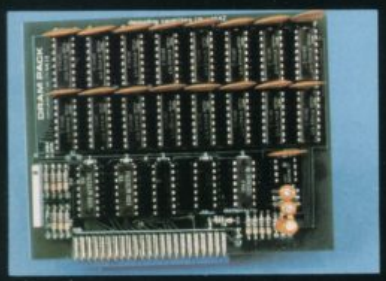
Vic dealers. Substantial discounts available. Please call us.



add up to 20k RAM + 16k ROM

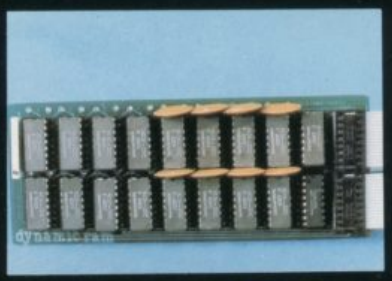
VCR 20 for VIC
4K-£24, 2k increment-£5

DRC for PET
64K-£80 128K-£130

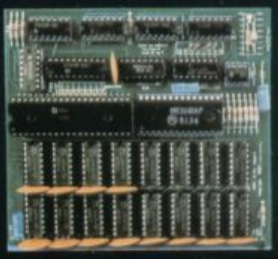


TRS80-V.GENIE

32K bytes — £29

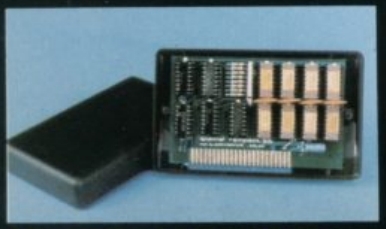


32K add on RAM £46



UK101:

32K add on RAM **£69**



56K — exceptional low power consumption — £44.90

64K + Eprom programmer & user port — only £79

We can adopt the above products for ZX81 to fit your new Spectrum for just £5 Extra.

FOR A FREE BROCHURE, RING LINDA OR SUE ON SOUTHEND (0702) 613081
FOR CREDIT CARD ORDERS, RING JACKIE OR PAM ON SOUTHEND (0702) 618144

CHEQUES AND P.O.'s TO:

AUDIO-COMPUTERS

87 BOURNEMOUTH PARK ROAD,
SOUTHEND ON SEA – ESSEX SS5 2JJ

ALL PRICES INCLUDE V.A.T. AND POSTAG

TELEX 995337 G AUDCOM

A TRADEMARK OF SOLIDISK LTD.

COMPUTER & VIDEO GAMES

CONTENTS

SEPTEMBER 1982 No. 11

News & Reviews

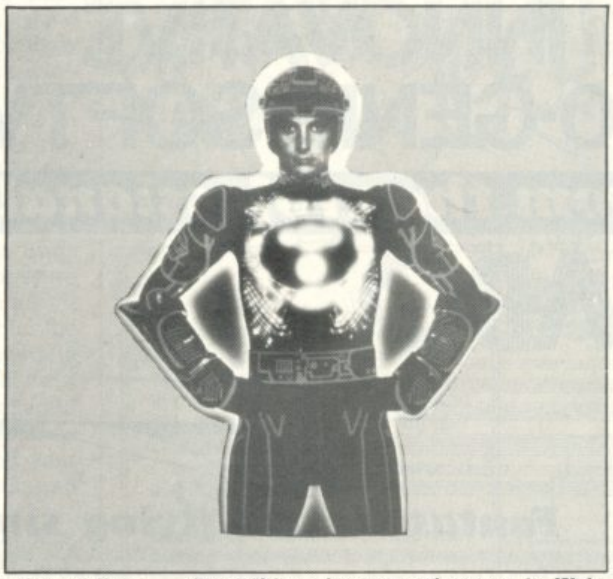
GAMES NEWS 18
It's cartoon capers time as Mickey Mouse and Popeye turn up among the usual aliens and some nasty robots.

VIDEO SCREENS 22
The galaxy is torn by conflict as Activision and Atari battle to produce the first VCS version of Star Raiders.

REVIEWS 76
Our revamped review pages mark up the best and worst of the games software releases.

ARCADE ACTION 78
It's seconds out as Kid Kangaroo's Mom pulls her gloves on. And creepie-crawlie haters will love our Centipede tips.

NEXT MONTH 5
Our last words on that World Cup prove to be accurate ones.



This is Tron — the striking character who stars in Walt Disney's latest science fiction blockbuster of the same name. More about him and the film inside. . . .

Light Fantastic . . .

The shape of films to come — that's Tron, the latest eye-dazzling epic from the Walt Disney studios. It's a magical adventure into the world of computers — and includes sequences animated by computer. We asked our American friend Fred D'Ignazio to give us the run down on the movie which will rank with Star Wars and Star Trek as a sci-fi classic. His detailed article on the making of Tron appears on page 70 of this issue. There are some exciting stills from the film to give of taste of what you'll see on the big screen.

There's also an exploration into the unknown as David Langford toys with antimatter on page 28.

Listings

STAR WAR 32
Piloting a rebel ship through a meteor storm is difficult enough — but when you've got an Empire starfighter blasting away at you too — it's almost impossible! Take off for the stars in your Atom.

COLDITZ 36
The name strikes terror into the heart. It's the ultimate prison. No-one can ever escape. Or can they? Here's your chance to make a bid for freedom — with the help of your TRS-80.

FOX AT DUSK 40
Wily old Reynard the Fox is on the prowl around your ZX81. You are the Master of the ZX hunt — can you trap the brush-tailed bandit.

DIAMOND DRAUGHTS 42
No little green men. No meteor storms. No noisy laser blasts. This is a game for all you quiet Spectrum owners out there who fancy a peaceful board game for a change.

CODEBREAKER 46
Can you keep a secret? Your mission, should you chose to accept it, is to crack the hidden code using your trusty Pet.

BOMBER 50
Beware the bouncing bombs. The hopping horrors will wipe you out without mercy unless you keep ducking and weaving with your Atari 400.

MINI-DEFENDER 53
Arcade action on your ZX81 — and all in just 1K!

PACMAN 54
The greedy gobbler comes to colourful life with the help of your VIC-20.

ALIEN LEMMINGS 57
Here they come — the little furry aliens racing towards ultimate extinction. We know our readers are conservation minded — so all you Apple owners get together and help save the alien lemming — quickly before it's too late!

Features

MAILBAG 7
More news and views

COMPETITION 12
We could bring your dream game to life

CHESS 25
Max Bramer streamlines the endgame

BUGS 27
Only the Bugs can save the lonely little Life cells

ANTIMATTER 28
David Langford boldly goes where other programmers fear to tread.

PRACTICAL PROGRAMMING 62
Interaction and communication.

GO 65
Allan Scarff shows how to get a program to play the game.

ADVENTURE 66
Keith Campbell joins the Bucketeers!

GAMES SAY 69
ARNOLD ARNOLD analyses the chess problem.

TRON 70
We look at the Walt Disney film set inside a games computer which is destined to spark off a cult.

KIT KORNER 73
Chips with everything.

GRAPHICS 81
Garry Marshall on micro's for graphics

BRAINWARE 82

SOFTWARE GLOSSARY 83

HARDCORE 84
A games player's guide to the MZ-80K.

Editor Terry Pratt. **Staff Writer** Eugene Lacy. **Editorial assistant** Susan Cameron. **Design** Linda Freeman. **Production editor** Tim Metcalfe. **Advertisement manager** Rita Lewis. **Advertising executive** Neil Wood **Advertisement assistant** Louise Flockhart. **Publisher** Tom Moloney

Editorial and advertisement offices: Durrant House, 8 Herbal Hill, London EC1R 5JB; Telephone Editorial 01-278 6556, Advertising 01-278 6552

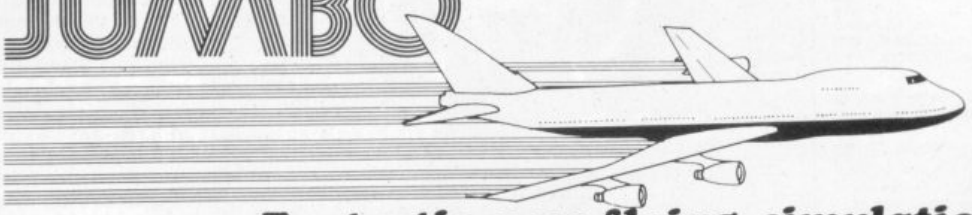
COMPUTER AND VIDEO GAMES POSTAL SUBSCRIPTION SERVICE. By using the special Postal Subscription Service, copies of COMPUTER AND VIDEO GAMES can be mailed direct from our offices each month to any address throughout the world. All subscription applications should be sent for processing to COMPUTER AND VIDEO GAMES (Subscription Department), Competition House, Farmdon Road, Market Harborough, Leicestershire. All orders should include the appropriate remittance made payable to COMPUTER AND VIDEO GAMES. Annual subscription rates (12 issues): UK and Eire £10.00 Overseas surface mail £12.00 Airmail Europe £20.00 Additional service information including individual overseas airmail rates available upon request. Circulation Department: EMAP National Publications. Published and distributed by EMAP National Publications Ltd. Printed by Eden Fisher (Southend) Limited.

© Computer & Video Games Limited ISSN 0261 3697.

Cover: Walt Disney Productions

INNOVATIVE
TRS 80-GENIE SOFTWARE
from the professionals

JUMBO



Fantastic new flying simulation

Occasionally a program comes along of such magnitude that it is hard to describe it, especially within the space allowable in an advertisement. Jumbo is such a program. There have, of course, been flying simulation programs before, but they have all rather fallen into the trap of trying to produce a graphic representation of the ground at some stage or other in the program, thus taking up space, and/or they have concentrated on the single act of flying. In other words, although one gets the feeling of flying a small aircraft, one is not going anywhere.

Jumbo is a fantastically accurate simulation of flying a Boeing 747. These planes are not small, and are not flown by eye. They are flown by eyes and instruments, and the instrument graphics in this simulation are really first class. As you may know, the primary instrument of an aircraft is the artificial horizon. This is simulated very well, and includes instrument landing approach indicators. Graphic maps of very high quality are produced and it is possible to fly in all of the British Isles including Southern Ireland, and to New York on the Eastern U.S. seaboard. The actual airports are at London, Birmingham, Manchester, Prestwick, Edinburgh, Belfast, Shannon and New York.

The program was written by two authors who combined their joint skills to produce a unique piece of software. The programmer got the last byte of performance out of the machine and the pilot the last drop of authenticity out of the simulation. Other simulation programs produce at best a similarity towards flying. With Jumbo you really feel that you are behind the controls.

The authors have used a number of gimmicks and programming techniques. For instance, it is possible to switch on an automatic pilot and to jump forward in time in increments of one minute or one hour — otherwise of course a flight from London to New York or vice versa would take some 8 hours to simulate. Whilst in this time skip the various controls are left as they are but fuel consumption and distance to go are taken forward at their correct rate.

A chart is supplied containing various items of data which you will need, including the take-off data for a 747 with various take-off weights, flap retractions, climb and cruise speeds and descent distances.

Realising that not everybody can fly a 747 and that there is even a large proportion of the population that cannot fly anything, two important items of assistance have been added. First of all is the documentation. This is split into two parts. The second is a "manual" on flying the 747. In other words, the instructions for running the program. The first part, however, is what amounts to an instruction manual for flying. It assumes that the user knows nothing about aircraft and although we do not purport that it gets anybody up to any sort of standard after it has been assimilated, the reader should have sufficient knowledge of flying and the theory of flight to fly in the program itself. The second feature of assistance to the novice pilot is a feature in the program which enables the user to practice landings. When the program is started, if one presses the P key, the aircraft is automatically put 11 miles out from London Airport approaching on an instrument landing.

The controls are pretty well complete, even to dive and wheel brakes. The flying track may be continuously monitored on the map display. Bearing and distance to your intended point of landing are available all the time. The instruments, incidentally, consist of:

- Artificial horizon
- Aileron indicators
- Indicated airspeed
- Power setting
- Elevators
- Attitude
- Compass
- Turn indicator
- Flap indicator
- Altimeter
- Fuel
- Elapsed time
- Distance to landing
- Rate of climb

Six maps may be chosen, as follows:

Scotland, Northern England, Southern England, Ireland, Eastern U.S.A., The whole of the U.K.

Route information and present position are shown on the map displayed. It is very difficult to think of any factor that the authors have overlooked. Even the quite meaningful thinning of the air with increasing height, which greatly affects the airspeed indicator in real life, is taken into consideration. Rather than having a fixed stalling speed, this continuously changes with the flight configuration, the weight, height and power setting, again as it does in real life.

We like to think that we publish good programs. Jumbo is outstanding. It is available on tape or disk for 16K or 32K memory machines. It is compatible with the Model I and Model III Tandy, Video Genie, Genie I and Genie II machines.

Tape ..... £15.00 + VAT = **£17.25**

Disk ..... £17.00 + VAT = **£19.55**

Plus 75p P & P please.

MOLIMERX LTD

A J HARDING (MOLIMERX)

1 BUCKHURST ROAD, TOWN HALL SQUARE, BEXHILL-ON-SEA, EAST SUSSEX.

TEL: [0424] 220391 / 223636 **TELEX 86736 SOTEX G**

TRS-80 & VIDEO GENIE SOFTWARE CATALOGUE £1.00 [**refundable**] plus £1 postage.

NEXT MONTH

What can you do with old copies of Computer & Video Games& They don't make very good paper hats and are not particularly adept at jamming delinquent Rampacks into place.

So why not keep them for future reference in a bright glossy binder complete with a **Computer & Video Games** logo.

Then when you want to look back and relive your favourite Bugs script, or check up on that obscure company which produces a speech-synthesising joystick for the UK 101, which we mentioned in Hardcore, then you will have a ready library of neatly packaged **C&VG** issues, looking as good as the day you picked them off your newsagent's shelf. More details and a form to fill in on page 17.

● Don't be ashamed of the bugs that find their way into your programs, take them out with you. **Computer & Video Games** is the only magazine which can put a Bug on your chest. We have a new line in T-shirts which feature a rampaging Bug, behaving in the manner we have come to expect from Screaming foul-up. Turn to page 17 to see what awaits your chest.

NEXT MONTH

A Sharp Defender game which has produced "Ooohs" and "Aaahs" of delight in the C&VG office when we tried it out, will be gracing our October issue. This is the issue which puts the capital G back in the games section of our magazine and we think we have picked out 10 games which will prove an inspiration to all our aspiring programmers.

October is also the last issue of entries eligible for our programmer of the year competition and the standard should prove pretty high. So please write in and let us know which game gets your vote.

Also for perusal next month, is Space Watch, a game which takes a very different look at invaders from outer space . . . you have to befriend them! Will it ever catch on?

Wild Strawberries is the name given to a version of Alien Panic, Kamikaze send the invaders into shutes but can you keep them bottled up?

There's a competition for those of you who have read this issue's piece on Tron and can't wait to find out more about this amazing film.

All this just one month away . . .

NEXT MONTH

How did you fare in our World Cup Competition? To predict a 1,2,3 of Italy, West Germany and Poland you needed clairvoyance rather than a football brain.

But the World Cup Manager game we featured in our June issue did have some measure of success in predicting the results individually as listeners to London's Capital Radio may already have heard.

A few brief alterations were made to the game, which runs on a Sharp MZ-80K, to enable it to play any one-off game. Then it was sent along to Capital Radio's Euston offices to have the squads and tactics of each team keyed in and the games played out to give a prediction of the result, the mornings before the games were played.

Capital reporter Rob MacKenzie was given the job of running the games through the Sharp and he claims a 75 percent success rate on the results, if not the actual scorelines.

"We took an average over ten games and had a fairly high level of success. Our most memorable success was the Brazil-Russia game when, not only did we get the result right, but we also predicted the late goal."

BUGS BEATEN!

A BBC Microcomputer has been won by Kevin Williams of Sutton Coldfield, West Midlands in our Beat the Bugs Competition published in our June issue.

Readers were asked to write a program to solve the puzzle which was given away free wit the magazine in the shortest time possible. Kevin managed to beat all other entrants with a program written on his Acorn Atom which beat the Bugs in the incredible time of less than one second.

Not getting a regular copy of *Computer & Video Games* eh! How do you expect your micro to work proper if you aren't reading the magazine every issue? And you with a nice little computer like that too.

It would be a real shame if anything should happen to it. Vulnerable things computers — especially if someone should start poking them around. S'pose one day you dropped a line into your computer and didn't get a byte huh?

Of course, I can't promise that if you had a regular copy of C&VG on order, your rampack would mysteriously stop wobbling overnight . . . but who can tell eh . . .

Just fill in the coupon, right, or I'll let you see your sister again, you know what I mean?

To my newsagent: Please deliver/reserve me a copy of Computer and Video Games every month. Price 75p.

Name .....

Address .....

.....

.....

.....

Silicon Chip

ATARI®

MAIN DISTRIBUTORS

Blend business with pleasure

ATARI

ATARI 400 16K RAM £199.00
ATARI 400 32K RAM £279.00
ATARI 800 16K RAM £499.00

ATARI HARDWARE

410 (Cassette)	£ 50.00
850 (RS232 Interface)	£135.00
822 (Thermal Printer)	£265.00
810 (5.25 Disk Drive)	£299.00
16K RAM Packs Ex-400	£ 40.00
New	£ 65.00
32K RAM Updates for 400	£ 89.95

ATARI SOFTWARE

Star Raiders (ROM)	£ 29.95
Missile Command (ROM)	£ 29.95
Asteroids (ROM)	£ 29.95
Pacman	£ 29.95
Caverns of Mars (Disk)	£ 29.95
Music Composer (ROM)	£ 35.00
Assembler Editor (ROM)	£ 39.95
Pilot (ROM & Cassette)	£ 79.95
Super Breakout (ROM)	£ 29.95
Computer Chess (ROM)	£ 24.95
E.M.I. Darts (Cassette)	£ 19.95
E.M.I. Snooker (Cassette)	£ 19.95

A.P.X.(ATARI PROGRAM EXCHANGE

Eastern Front (Cassette)	£ 24.95
Outlaw/Howitzer (Cassette)	£ 13.95
Avalanche (Cassette)	£ 13.95
Babel (Cassette)	£ 13.95
Anthill (Cassette)	£ 13.95

COMPUTE Magazine:
A 200 page magazine that we import from the U.S.A. containing articles, programs and reviews of software on the Atari, PET and Apple. ..... £ 1.85 + 55p P&P
The COMPUTE Book of Atari ..... £ 12.95
The COMPUTE Book of PET/CBM ..... £ 12.95

BUSINESS SOFTWARE

Chipsoft Payroll	£149.95
Chipsoft Stock Control	£149.95
Chipsoft Sales Ledger	£149.95
Chipsoft Purchase Ledger	£149.95
Textwizard (Word Processor)	£ 99.95
Atari Word Processor	£ 99.95
VisiCalc	£109.95
Microsoft Basic	£ 59.95

NEW SOFTWARE

Crush, Crumble & Chomp (D/C)	£19.96
Crossfire (D/C)	£19.96
Ali Baba & The 40 Thieves (D)	£22.00
Mission Asteroid (D)	£17.56
Action Quest 16K (D)	£19.96
Raster Blaster (D)	£19.96
Frogger (D)	£29.96
Warlocks Revenge (D)	£27.60
Jawbreaker (D/C)	£19.96
Pathfinder (D)	£23.96
Canyon Climber (D/C)	£19.96
Temple of Apshai (D/C)	£27.60
Bug Attack (D/C)	£19.96
Apple Panic (D)	£19.96
Tumble Bug (D)	£19.96
Atari World (D)	£39.96
Wizard & The Princess (D)	£22.00
Threshold (D)	£27.60

Prices include postage and packing

All hardware or software purchased from either of our two shops comes with our one year direct exchange guarantee.

Visual Display Units (V.D.U.s) 12 inch green screen monitors	£ 99.95

We also stock Atari T.V. games.

Atari Consoles	£ 89.95
Pacman Cartridge	£ 29.95
Chopper Command	£ 24.95
Star Master	£ 24.95
Imagic Demon Attack	£ 24.95
Imagic Star Voyager	£ 24.95
Joysticks	£ 12.00
Paddles	£ 13.95

Do you have a software problem?

Talk to our Software Department and we will write your program for you.

All programs written in Microsoft BASIC for this Atari 800 Computer.

Ask about Part-Exchanges

Silicon Chip

302 High Street, Slough,
Tel: Slough 70639

50 London Road, Kingston upon Thames
Tel: 01-549 6655

Please drop us a line at: Computer and Video Games, EMAP, Durrant House, 8 Herbal Hill, London EC1R 5JB.

ROYALTY RIGHTS . . .

Dear Sir,
Could you please tell me what the going royalty rates are for ZX81 programs submitted to large ZX software companies, in particular the companies which produce 16K Basic games on cassette?

Also could you put that into monetary terms after say 1,000 cassettes had been sold.
Richard Hessler,
Bonnyrigg,
Edinburgh.

Editor's reply: Royalty rates vary, depending on the software house you deal with, but a reasonable average seems to be 15 percent.

If 1,000 cassettes are sold at £5.00 plus VAT, my calculator works this out at £750. But a sale of 1,000 is still very rare for any cassette.

VARIABLE PUCKMAN

Dear Sir,
After playing the excellent Minotaur program on my VIC-20, I decided to have a go at converting the Pet program called Puckman to run on my VIC.

A change was made to a few variables, the layout of the maze, and I left out the lengthy instructions so that it would fit inside 3.5K.

The program ran, but soon crashed after a few loops of the game, with an "Out of memory error" message.

On inspection of the original listing lines 250 and 350 use "go to's" to exit from a "gosub" routine and a "goto" is used to re-run the program, to keep the top score intact. The solution was to change all the gosubs to gotos, and it worked.

Another problem I encountered turned out to be a bug in my VIC, where VAL(TI$) was used in lines 50 and 60. An '@' symbol flickered in the top left hand corner of the screen (when the screen colour was black), but this was cured by changing VAL(TI$) to TI and multiplying the associated variables by 60 (jiffies).

To make the game more realistic, I have used the user defined graphic capabilities of the VIC, with good results, and all that is left now is to program some sounds into it.

May I just say how much I look forward to your magazine each month, and hope that the above tips might help other VIC users.

I would also like to know if it would be possible to produce a badge and teeshirt with Computer and Video Games logo, not forgetting the lovable Bugs, for all your readers to wear?
Michael Maxwell,
Andover,
Hampshire.

Editor's reply: Our thanks to Michael and the other readers who have reproduced our Pet games listings in VIC-20 form. I hope we can get around to printing them all one day.

Many of our readers have been asking about T-shirts. Just turn to page 17 of this issue where you'll find all the details.

SUBMARINE CHALLENGE

Dear Sir,
In the April edition of *C&VG* you printed a game called Sub-Attack for the VIC-20 and said the highest score so far was 1100. After programming my VIC-20, I managed to reach a score of 2,420 points. Has any other VIC owner managed to beat this score?
Christopher Hazell,
Rochester,
Kent.

RAINBOW CHASERS

Dear Sir,
Quite a lot of arcade players know how to get a "Rainbow" on Space Invaders, but some of us can go one better. A 500 bonus "Rainbow" is achieved on the Part II machines by leaving the five left side invaders to last and then shooting them in a top to bottom order.

But an 800 bonus score can be notched up by shooting the same five invaders in the order: second row, third row, fourth row, fifth row, first row. This is also known as a "spray", I hope you are interested.

My latest high scores are: Missile Command, 5,880,050; Scramble 811,500; Enigma II 590,250; Space Fire Bird 198,620; Gorf 205,190; and Lunar Rescue 450,010.

Keep up the good work. I like Arcade Action and I look forward to reading it every month.

The front covers are very eye-catching.
Martin Lund,
Pinham Road,
Skipton,
North Yorks.

QUADCUBE QUERY

Dear Sir
Could you please tell me where I would be able to obtain a Quadcube, you featured in your April edition.
Richard Butlin,
Heysham,
Lancashire.

Editor's reply: A Quadcube can be obtained from software specialists Workforce which is based at 140 Wilsden Avenue, Luton, Bedfordshire. The telephone number is Luton 418577.

MORE GAMES ON THE WAY

Dear Sir,
Could you please print some interesting games for the ZX Spectrum — I know that only a few are available at the moment but by the time August's issue of your magazine is on the streets many more people should have received theirs.
Mark McLean
Fareham
Hampshire

Editor's reply: We did manage to get our first ZX Spectrum game in time for the August issue, Mark and you also find Diamond Draughts in this month's offering. We hope to keep the Spectrum games coming in the future . . . watch out for Space Watch, next month.

COME AND MEET VIC
AT YOUR NORTH LONDON VIC CENTRE

SALE — VIDEO GENIE — SALE

EG3003	£240.00	EG400	£195.00
GENIE I	£269.00	EG3020	£35.00
GENIE II	£269.00	EG3022	£55.00
EG3014	£185.00	EG3015	£85.00

VIC SINGLE FLOPPY DISK

* 174K Byte Storage
* Direct Interface to VIC
* Direct Compatibility with printer

ONLY £335.00

VIC CASSETTE DECK

* Direct Interface to VIC
* Tape Counter

ONLY £34.00

supplied with Free cassette with 6 Programmes

VIC EXPANSION UNIT

★ 7 Slot expansion board, for: extra memory, Programming, Games, etc.

★ Modulator Holder

★ Enclosed Power Supply

EXPANSION UNIT with LID ONLY £82.00

**** SPECIAL SUMMER OFFER ****
EXPANSION UNIT WITH LID AND MACHINE CODE MONITOR CARTRIDGE **ONLY £100.00**

VIC 20 COMPUTER

* A Typewriter Keyboard.
* 5K memory-expandable to 29.5K.
* 8 programmable function keys.
* High resolution graphics
* Music in three voices and three octaves, as well as sound effects
* Eight border colours and sixteen screen colours

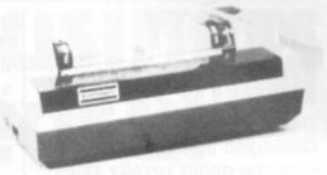
**** SPECIAL SUMMER OFFER ****
ONLY £165.00 + FREE CHOICE OF GAMES CARTRIDGES (Worth over £17.00)

SALE — UK101 KITS — SALE

P.P.I.	£19.95	Colour
Prog. Sound	£19.95	£59.95
PIO & Eprom	£19.95	Memory
J1 Expander	£ 9.95	£79.95

All kits now ready-built and tested

VIC PRINTER



* 80 characters per line
* 30 characters per sec
* Dot Matrix printer
* Tractor Feed

ONLY £185.00

CARTRIDGES

8K Memory **£34.00**

16K Memory **£59.00**

Programmers Aid **ONLY £27.50**

Super Expander High Resolution graphics with 3K RAM **ONLY £27.50**

*** SPECIAL SUMMER OFFER ***
MACHINE CODE MONITOR ONLY £25.00

TERMS OF BUSINESS

Please add 15% VAT to all Prices. Deliver charged at Cost. Prices valid for coverdate of this magazine. Phone or Send your Order **TODAY** using

ACCESS OR BARCLAYCARD

Please send me a copy of your '**VIC LIST**' containing Software, Hardware and Books for the VIC 20

NAME _____

ADDRESS _____

_____

C.V.

CHROMASONIC electronics

48 JUNCTION ROAD, ARCHWAY, LONDON N19 5RD 100 yds FROM ARCHWAY STATION TEL: 01-263 9493/01-263 9495 TELEX: 22568.

MAILBAG

SATISFIED CUSTOMER

Dear Sir,
I'd like, through your pages, to send a thank-you to one of your advertisers, DK'tronics of Great Yarmouth. My son sent off for their keyboard for the ZX81. When the keyboard/ZX81 combination didn't work properly, I posted it to DK'tronics who promptly returned it in perfect working order.

To my delight the repair was made free of charge — although it seems that the fault lay in a joint that was poorly soldered at the Sinclair factory.

Incidentally, if any reader is considering an add-on keyboard for the ZX81 and is worried about having to perform the necessary soldering, just do what I did. Visit your local TV rental shop, go round the back door to have a word with one of the technicians and get a beautiful job done for the price of a drink!
R. Millington,
Kingston,
Surrey

THE DATA DEBATE . . .

Dear Sir,
Many of your readers must have blushed with shame, as I did, on reading your reply to 13-year-old Master Sacaloff. The idea that the ZX81 puts data from a REM in line 1 into a special buffer may be interesting but it is pure fantasy (a polite word for rubbish).

He will not have to read many of the excellent books on the market to discover that there is no such buffer and that the ZX81 treats line 1 in exactly the same way as every other line.

What you should have told him is that he is absolutely right and that the computer does indeed ignore statements in a REM and so it does not know that there is any machine code there until you tell it so by using the USR function.

Since the first line of any program, no matter what its number, always begins at address 16509 and since the first four bytes are taken up by the line number and line length, and the fifth will be the word REM itself, the data starts at address 16514.

The command RAND USR 16514 tells the computer to go to that address and to treat what it finds there as machine code which is exactly what he wants. In fact machine code can be put in a REM in any line so long as one can find its address (and there are several ways of doing that).
Dr. L. F. W. Rowe,
Exeter, Devon.

Editor's reply: Dr. Rowe, is of course right. My original explanation had the fault of over-simplification. The "buffer" that I was referring to, in fact, started at location 16514! This seemed to me the simplest way of explaining things as I did not want to get involved with how the ZX81 actually stored a program — that would take quite a lengthy article to do it justice, and just to confuse matters, the Spectrum is more than subtly different!

You were also quite right about the machine code data going anywhere in a program — and you rightly pointed out that there are ways of accessing the right address. Again this is a more difficult problem for some of our readers and simplification, as long as it is not misleading, is sometimes better than a long and too technical answer.

WHAT, NO CARTOON!

Dear Sir,
What happened to August's Arcade Action pages? I turned to them as usual for my monthly laugh at Ian Bennett's delightful cartoons and what did I find . . . ? No cartoon!

Has Mr Bennett run out of ideas so soon? If so perhaps I could encourage him by praising his Asteroids cartoon in the June issue. It reduced myself — and a few colleagues with a similar sense of humour — to tears.
Trevor Ruddick,
Slough,
Berkshire.

Editor's reply: No, Ian hasn't run out of ideas Mr Ruddick. It's just that occasionally we run out of space on our Arcade Action pages. To prove that Ian is still taking a humorous look at the arcade scene, I have included the cartoon which was pulled out of our August issue. I hope it raises a few chuckles!

MONKEY BUSINESS . . .

Dear Sir,
Regarding your Donkey Kong tips in the June issue I was suprised to see a very important tip left out. On the third screen a player should go to the top of the second set of ladders jump out any lift wait about two seconds till his jumping foot clears the first platform and then jump onto the second platform, this does not result in a long plunge to the bottom as you might suspect it to but you will land safely on the ledge.

This comes in handy on higher levels as you get a higher bonus and avoid dodging the oncoming springs.
John Dickson,
Cumberland Road,
London

SNAKES FAN SPEAKS OUT

Dear Sir,
Thank you for an excellent magazine which I read avidly every month. And thank-you to A. Woral for the lovely Snakes and Ladders program in your July issue.

I would like to suggest, however, that a simple amendment to one program line makes the players easier to follow as they move around the board by displaying them on the target square before moving them up a ladder or down a snake. Simply change line 210 to: 210 Z=BBR;GOS.v;GOS.t;Y=BBR; BBR=Z;GOS.u;BBR=Y

I am presently awaiting delivery of a BBC ROM for the Acorn Atom and will hopefully send you some programs written with it — when it eventually arrives.
Adrian Pegg,
Sun Street,
Derby

MICROS MAKE NICER FOLK

Dear Sir,
Is the micro business different? I live out in the wilds of Cumbria, so all my problems and enquiries are sorted out by telephone.

And, what do I come up against, no *not* indifference, but keen interest and politeness, and even humour, at times for questions of no monetary rewards.

My special thanks to Stack of Liverpool, and Anglo American of Birmingham.

If this is what having a computer means, then long may you all prosper.
A. C. Poole,
Ambleside,
Cumbria

ZX 81 SPECTRUM . . B.B.C. MICRO . . ATOM . . VIC

NEW!

Spectral INVADERS

The very first, perfect arcade quality Machine Code game on cassette for the sensational SINCLAIR ZX Spectrum

Just £5 inclusive
12 months guarantee

BBC SPACEWARP (32K)

Space Warp is a fantastic space adventure game, far more sophisticated than most 'Star Trek' type games. Makes full use of the sound and graphics facilities, and comes with a 15 page instruction booklet and a function key template. Probably the most complex space game yet. Includes high-resolution sector and battle displays, full status reports, energy allocation displays, and much more.

£11.50 inclusive

SPACE PIRATES (16K)

Space Pirates is a new arcade-style game for the model A model B B.B.C. Micro, using high-resolution graphics and sound. Protect your space eggs from the invading pirates. Written in machine code for fast action and incredible graphic effects.

£8.00 inclusive

BBC CHESS (32K)

Very powerful chess game for the B.B.C. Micro. One thousand levels of play, plus many options including setting up board for chess problems, saving game on tape etc. Deals with castling and en passant.

£11.50 inclusive

POLARIS (32K)

You are the captain of a Polaris submarine sailing through enemy waters. The enemy are attempting to get a large convoy across the sea to support their troops – your mission is to sink a vital tonnage to prevent this. Computers responses are very fast.

£8.00 inclusive

B.B.C. MULTIFILE	£25.00
B.B.C. BACKGAMMON	£8.00
B.B.C. GOLF	£7.00

SINCLAIR ZX81

MAZOGS	£10.00
STARTREK	£5.00
ZXAS ASSEMBLER	£5.00
ZXDB DEBUGGER	£5.00
ZXTK TOOLKIT	£6.00
MULTIFILE	£17.50
INVADERS	£4.00
DICTATOR	£9.00
DAMSEL & THE BEAST	£6.50
CONSTELLATION	£8.00
PROGRAM PACKS 1-8 (each)	£4.00

VIC 20

ANOTHER VIC IN THE WALL	£7.00
VICGAMMON	£7.00
VIC PANIC	£7.00
VIC COSMIADS	£7.00

ATOM

INVADERS	£8.00
CHESS	£9.00
747 FLIGHT SIMULATION	£8.00
GALAXIANS	£8.00
BREAKOUT	£4.00
FRUIT MACHINE	£4.00
PINBALL	£4.50
LABYRINTH	£7.00
LUNAR LANDER	£5.50
GOLF	£5.00

ALL PRICES INCLUDE POSTAGE

ORDER YOURS TODAY!

Please send me .....
I enclose cheque/P.O. for .....
OR Please debit my Access 5224 .....
BARCLAYCARD 4929 ..... Expiry date .....
Name .....
Address .....
Code .....
Dealers Discount Available
ACCESS, BARCLAYCARD ORDERS WELCOME ON 24hr ANSAPHONE 051-227 2642, or mail to.
BUG-BYTE SOFTWARE,
FREEPOST, (No stamp req.)
LIVERPOOL L3 3AB.

CVG.9.82

VISA

BUG-BYTE SOFTWARE

BUG-BYTE SOFTWARE, FREEPOST (No Stamp req.) LIVERPOOL L3 3AB.

ZX 81 . . SPECTRUM . . B.B.C. MICRO . . ATOM . . VIC

MAILBAG

PLEA FROM THE ATARI

Dear Sir,
May I first congratulate you on the content, value for money and the information on video games provided by your excellent magazine which I have taken from issue number one.

However, as an Atari 400 owner I have one complaint. I feel that the monthly games program for the Ataris are slowly deteriorating.

In fact the last two published, i.e. Double Barrel and Boing, are an insult to the capabilities of an Atari.

In times likes these where W. H. Smith bookracks offer five or six mags per month solely for Sinclair owners (and several other mags that tend to favour Acorn, BBC, VIC etc.), don't you think you could provide a little more interest for the minority?

Come on *C&VG* let's have more interesting listings up to the standard of "Mini Golf" and "Changing Hearts". Are we Atari owners to be penalised and neglected for buying American?
Eric Bacon,
Worksop,
Nottinghamshire.

Editor's reply: As you pointed out Eric, the Atari has had some good long games published for it in *C&VG*. We do try and achieve a balance by offering a few shorter programs for Atari owners who cannot find the time to type out a massive listing.

But perhaps the most important point I can make from your letter, is that this magazine is only as good as its contributors — in this case that means Atari owners who are willing to send in games listings.

We pay £10 for each published listing and there is a chance for readers to be entered for our Game of the Year Competition — first prize being a trip for two to Paris complete with spending money. You still have two months to enter.

THE NEWS IS AT FAULT

Dear Data Manipulator,
I would like to say what an invader-zapping piece of literature your magazine is.

I have scanned through some other computer magazines but only a few have been anywhere near your standard. The rest have been calculated as being processed garbage!

I especially like the Games News bit.

But may I point out one slight fault — only on a few of the games in this section do you express your opinion. You could try putting ratings at the end of each game review. For example: value for money, use of graphics, and quality of game.

Also, in the April issue — in the American Dreams section — you mentioned the Commodore Ultimax. How large is the memory of this unit?

Are there disc drives or colour/sound boards for the ZX81? If so, how much are they and who sells them?
Simon Spencer,
Ormskirk,
Lancs.

Editors reply: We are often informed of games to include in the news pages before the finished product is available. If we didn't write about them until the cartridge was on sale by the time it would be published the game would be old. That is also why we do not use a rating system for the games. In depth analyses of games are kept to the review pages, where a rating system will soon be introduced.

Commodore Business Machines has renamed the European version of Ultimax the VIC-10 which was unveiled at the Hanover Fair in March. The basic system has a memory capacity of 2K and it should be available in September, costing £100.

There are no disc drives available for the ZX81 computer and none are likely to be developed.

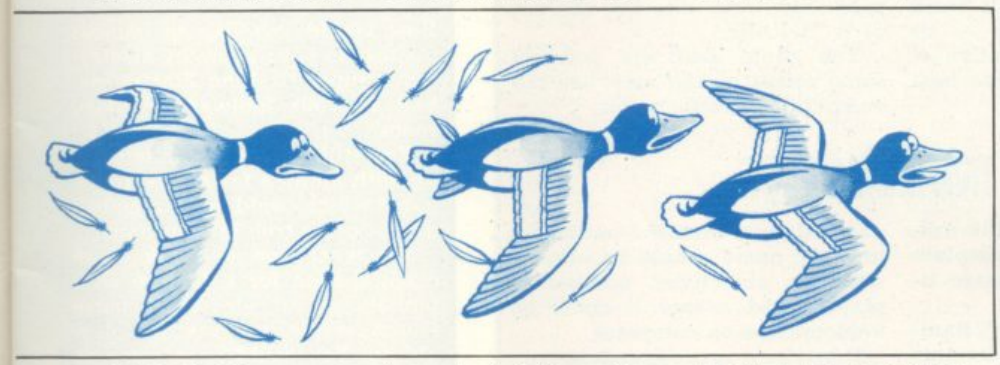


Illustration: Terry Rogers

BATTLE ZONE EXPERIENCES

Dear Sir,
I am writing in with regard to the arcade news section of the July issue of **Computer and Video Games**, in particular to the Battle Zone score printed.

I am not saying that the explanation below is the cause of the five million score printed out but I cannot imagine one person playing battle zone for 6 hours on the trot.

When I was new to Battle Zone I had wierd experiences with the scoring. Suddenly it went haywire and gave me a really high score for nothing. This is not an isolated happening as it has happened on two machines that I have used — if these scores are to be recorded then my two highest scores are 74,032,000 and 56,280,000.

Incidentally, my printed score of 319,000 has been broken by at least two aquaintances of mine reportedly both scoring over 500,000.

As I say, I believe it may be possible to score 5½ million on Battle Zone but it would take a heck of a lot of effort to stay awake.
Mark McLean,
Fareham,
Hampshire.

WHEN DAD TAKES OVER

Dear Sir,
My family have recently received a BBC microcomputer, I used it about seven times and I am very impressed. But I never seem to be able to get on it any more.

I wake up in the morning to hear a tap tapping on the keys. I come home from school and my Dad is using it again.

My Dad is new to computing and is very keen. He has been working on an accounts program about a week now and today he came into the kitchen and explained that he had run out of memory space.

I was quite amazed at this as it is his first program and the computer has 32K.

I am very pleased that you are producing OWL for the computer and hope you will keep it up.
Stephen Seymour,
Ropley,
Hampshire.

SPEEDING UP THE TRS-80

Dear Sir,
I had the same problem as C. Bennett which was that we found the TRS-80 Basic was rather slow. I overcame this problem, though by learning machine code and imbedding it into my basic programs. This did wonders to my programs and now I write fast exciting games. Don't be afraid to use machine code.

Another idea is to buy a compiler which would speed up your game no end but this could be quite expensive.

I hope I have helped people with my ideas.
D. Cromwell,
Letchworth,
Hertfordshire.

WE'RE AIMING FOR PERFECTION

The perfect computer game, I decided, should be based on strategy.

It needed plenty of scope for innovative tactics, fast action, some pretty neat algorithms to keep the human player guessing, a simple set of rules and an original and imaginative story line.

Mine involved a computer-controlled team of 12 necromancers who kept up a constant stream of the most undesirable spells aimed at a prince with the sole aim of turning him into a frog.

While the player had an apothecary of mages (about 12) and a magic talisman and had to counter every spell hurled against him or develop a taste for flies. I was going to call it Third Toe on the Left Flipper — or something just as imaginative — and it was going to be the best game ever.

But I took a look at the programming expertise involved — and it was promptly shelved. I'd stolen the idea from a fantasy novel anyway. But with the help of a software company like Psion and the backing of Sinclair, I am still convinced that every home would have been the richer for a copy of Third Toe of the Left Flipper.

If you've ever dreamt up the perfect computer game but found that putting it into lines of code was beyond you, then this issue of C&VG could be your saviour.

In conjunction with Sinclair Research and top software house Psion, we are giving readers the chance to get their game idea into production and onto the shelves of W. H. Smith.

You could also win yourself some prizes on the way. See the competition details below.

ORIGINAL AND IMAGINATIVE . . .

The five new Sinclair ZX81 cassettes provide a pretty complete base to any games software library.

All for the ZX81 with 16K Rampack and written by top Sinclair software house, Psion, we are offering five sets of these cassettes to the winner and four runners-up in our Computer Game Competition.

The cassettes on offer are: Flight Simulation; Space Raiders, a space invaders game which shares cassette space with Bomber; Sorcerer's Island and Perilous Swamp, two adventures on one cassette; Chess and Backgammon.

As well as these, our winner will receive a Sinclair printer or a £60 voucher to put towards any Sinclair product he chooses.

But the real prize is a visit to Psion to see how a commercial software house operates and a chance to talk over your game ideas with the Psion programmers and see if it is practical to write the game and sell it under the Sinclair banner. If the game is good enough Psion will undertake to write it and Sinclair to market it.

What we want from you is a game title, a detailed outline of how the game should be played, with the objectives, number of players and a way it could be implemented on computer.

It can be a space invaders-type reaction game or a new look at adventure games. It can be as strategic as chess or as baffling as a Rubik's Cube.

If it is set to a storyline then you should give us the tale behind it. If it involves carefully computed tactics then you could provide the necessary algorithms to give the machine a good chance of winning.

We are looking for games that are original and imaginative but remember they must also be practical.

All entries will be the property of Psion. And no employees of EMAP, Psion or Sinclair Research may enter the competition. The judges decision is final and no correspondence will be entered into.

The closing date is 16 September 1982 and entries should be addressed to Computer Game Competition, Computer & Video Games, Durrant House, 8 Herbal Hill, London EC1R 5JB to reach us by then.

BRAINWARE

The answers to our August Mind Routine problem is: 4683

7+2+1+2×6−2+3+7−4+3×5−3−2×4×3+3

The correct solution to last month's Nevera Crossword is printed right and the winners names will be published in next month's issue.

For more puzzles to test your brain power simply turn to page 82 where you'll find the puzzling Mind Routine and our monthly wordgame the Nevera Crossword.

NOW SOME PINB

How would you like to impress visitors to your home by displaying a super flashing Electra pinball in your hallway or living room?

You still have a month to come up with an idea for an electronic game which could make a pinball dream come true in your home.

We want you to think of an original idea for a feature on a pinball or an electronic game which would inhance its playability. You could even come up

ANSWERS

BALL WIZARDRY

with an idea for an entirely new machine.

Bally hope to find a completely fresh outlook to arcade games. It can be a single feature on a game or a whole new concept but it has to be practical so bear in mind the following criteria.

- Physical dimensions
- The game should be capable of being mass-producted.
- Cost.
- Weight.
- That it is safe to be used by the arcade player.
- The idea must not be stolen from any other arcade or pinball machine.
- And most important, it should be creative and original.

The Bally Pinball Division will present an Electra pinball machine to the grand prize winner. All entires will be judged by the Bally Pinball Division's new product board and announced in Computer & Video Games. All entries will be the property of the Bally Pinball Division and the entrants will assign all rights, patents and privileges of their design to the Bally Pinball Division.

No employees of Bally or Computer & Video Games or their relatives may enter the competition. The judges decision is final and no correspondence will be entered into.

Send your entries to The Pinball Competition, Computer & Video Games, Durrant House, 8 Herbal Hill, London EC1R 5JB before September 16th 1982.

NOW BUSHCAT SPEAKS OUT . . .

Our Starweb game is up and running and interstellar conflict is just around the corner.

In our May issue play-by-mail games company, Flying Buffalo offered 15 readers the chance of competing in a free C&VG Starweb game and we promised to keep the rest of you in touch with events once the game had progressed sufficiently for players giving notice of their intentions not to suffer as a result of these indiscretions.

First writer on the game. Just giving his early impressions and perhaps a better understanding of computer moderated gaming is Paul Hardy, alias Bushcat the Pirate — the sort of character who gives space fiends a bad name. Take it away Bushcat . .

Starweb is role-playing Adventure-style set in space where, due to the foresight of some extinct super-race each star system is linked to three others by a transportation network allowing instantaneous point-to-point travel.

The characters within this game have differing objectives, with Apostles converting populations, Berserkers decimating them, Merchants trading between star systems and so on. I play the part of Bushcat the Pirate who gets his kicks plundering as do all good pirates.

Each planet is characterised by a population level, a varying ability to generate raw materials each turn, and an industrial base. Some planets lend themselves to ship-building, others to supplying raw materials and some to plundering. I have, in fact, found a totally empty planet. Tha one is earmarked for a bit of wanton destruction.

Each turn, I write orders for my fleets and possessions, specifying where fleets are to move, if they are to carry anything, who to fire at, which planets to build ships and all the nitty gritty of running an empire. The order sheets are then sent to a Midlands P.O. box which uses it's superior intellect to sort out everyone's moves, check them for validity, resolve conflicts between rival sets of orders and then returns a listing of planets visited, planets hinted at and current fleet status.

I have not made contact with anyone yet, but when I do they will get a good drubbing. Contacts are listed automatically and the game allows such contacts to communicate via diplomatic postcards.

I have noted a couple of "funnies" so far, for example the fleet that went two places at once. But on the whole I am getting to grips with everything, including the very detailed rulebook which caused a few late nights when it arrived. Starweb looks as though it will develop into an excellent game, if only the turn-around time can be reduced.

OUR WORLD CUP WINNERS!

Paoulo Rossi and co. now look as if they were always intended to win the world cup on that hot sweaty Sunday night in Madrid.

But who would have said so a couple of months before? Two of our readers that's who — in the great Silica Shop and Computer and Video Games world cup competition.

Silica Shop asked our readers to predict who would be first, second, and third in the world cup to win a £100's worth of computer equipment or an Atari 2600 TV Games Centre.

Victor Thorn of Dagenham and Malcolm Stowey of Mangotsfield near Bristol both predicted that Italy would win and Germany be runners up, though neither of them predicted the third place team — Poland.

As there was no outright winner the competition organisers have decided to split the prize between Victor and Malcolm who will both receive a voucher for £50's worth of computer equipment.

Nigel Judd of Silica shop said, "We had hundreds of entrants that included Brazil in some combination of first second and third — but Victor and Mathew were the only two out of over six hundred entrants who predicted the outcome of the final.

spectrum

Spectrum is a new, rapidly expanding group of independent retailers who specialise in selling a range of popular home computers.

Our group policy is simple: we won't be beaten on price and 'know-how'. We can make this claim because our bulk buying power ensures that we select and buy at the best prices and then can pass on the benefits to you.

We guarantee if you find an item advertised and in stock at any other retailer at a better price than us, we will match that price.

You will see we quote our prices both including and excluding VAT – no hidden 15% to suddenly uplift your bill but also making our prices easier to compare with our competitors.

To ease payment we accept Barclaycard and Access as well as our own Spectrum Charge Card. Longer term credit terms are also available.

We believe our product 'know-how' is crucial to you as a customer. In every one of our centres there are personnel who have been trained by the manufacturers or distributors themselves. So we know what we are talking about on the products we sell and can help every customer, including the complete beginner, find and understand the equipment to suit his or her needs. For us it's not just a matter of simply handing over a box and leaving you on your own to figure it out. Our service includes 'hands on' experience that we can pass on to you.

After sales care is also well catered for. Our own Spectrum Service Centres will insure that should your machine 'go down' we will get it up and running as quickly as possible. We can also offer extended warranties at reasonable prices.

When it comes to mail order delivery we use Securicor for despatch to anywhere in the British Isles. The cost is low and the service is good. Further details are available from your local shop at the time of ordering.

Finally, we should point out that although not every Spectrum centre carries every advertised item, they can always be obtained quickly from our central warehouse. If you have any difficulty, please telephone Spectrum Customer Service on (0727) 66646.

Spectrum Computer Group is a division of Spectrum (UK) Ltd - Britain's largest photographic retailing group.

ATARI®

ATARI 400

£217.30

£249.90 INC.VAT

Developed by the Company famous for its TV and arcade games the Atari Computers have superb colour graphics and facilities for the manipulation of visuals on the screen.

In-built "player-missile-graphics" enable the user to compose games to very professional standards. Any key on the keyboard can be made to produce any character the user wishes on the screen. Atari Computers have an extra microprocessor onboard especially to enable these unique features. There are over 200 programmable colours and tones and a wide range of programmable sounds.

Plug a "BASIC" cartridge in and you have a comprehensive computer.

The model 400 has 16K of RAM and a touch sensitive keyboard. The 800 model has a professional style typewriter keyboard and a memory which is user expandable to 48K. Add disk drives (up to 4) and a printer and you have a system of adequate power for business uses.

	EXC VAT	INC VAT
ATARI 800 16K COMPUTER (EXPANDABLE)	£434.70	**£499.90**
ATARI 410 PROGRAM RECORDER	£43.48	**£50.00**
ATARI 810 DISK DRIVE	£260.83	**£299.95**
ATARI 822 THERMAL PRINTER	£230.43	**£264.99**
ATARI 850 INTERFACE FOR DOT MATRIX PRINTER	£117.39	**£134.99**
ATARI 16K RAM EXPANSION FOR 800	£56.52	**£64.99**
ATARI GAMES PADDLES (PAIR)	£12.13	**£13.95**
ATARI GAMES JOYSTICKS (PAIR)	£12.13	**£13.95**
ATARI THERMAL PRINT PAPER (2 ROLLS)	£3.48	**£4.00**
ATARI BLANK DISKETTES (5)	£13.91	**£15.99**
SOFTWARE		
INVITATION TO PROGRAMMING (1)	£13.87	**£15.95**
INVITATION TO PROGRAMMING (3)	£19.96	**£22.95**
CONVERSATIONAL FRENCH	£34.74	**£39.95**
CONVERSATIONAL GERMAN	£34.74	**£39.95**
CONVERSATIONAL ITALIAN	£34.74	**£39.95**
CONVERSATIONAL SPANISH	£34.74	**£39.95**
MUSIC COMPOSER	£31.26	**£35.95**
TOUCH TYPING	£13.87	**£15.95**
ASTEROIDS	£26.04	**£29.95**
MISSILE COMMAND	£26.04	**£29.95**
PACKMAN	£26.04	**£29.95**
SPACE INVADERS	£26.04	**£29.95**
STAR RAIDERS	£26.04	**£29.95**
SUPER BREAK-OUT	£21.30	**£24.50**
VIDEO EASEL	£21.30	**£24.50**
COMPUTER CHESS	£21.30	**£24.50**
GRAPHIT	£12.13	**£13.95**
WORD PROCESSOR (DISK)	£86.91	**£99.95**
ASSEMBLY EDITOR	£34.74	**£39.95**
DE-RE ATARI	**£17.00**	**No VAT**

commodore

COMMODORE VIC 20

£173.90

£199.99 INC.VAT

The VIC 20 really is extraordinary value for money. It does so much for so little.

It's fully expandable to 27½K user RAM, has a full size typewriter keyboard and plugs straight into your home TV.

Micro soft 'BASIC' is standard but additional machine language is available via plug in cartridges. There is also a choice of other programs for chess, music and languages as well as games. Printer disk drive and other peripherals, software and books are all available to further expand your use and enjoyment.

	EXC VAT	INC VAT
VIC C2N cassette unit	£39.09	£44.95
VIC Printer (plain paper, tractor)	£200.00	£230.00
VIC Single floppy disc drive (5¼")	£344.35	£396.00
3K RAM expansion cartridge	£26.04	£29.95
8K RAM expansion cartridge	£39.09	£44.95
16K RAM expansion cartridge	£65.17	£74.95
Super expander Hi Res cartridge	£30.39	£34.95
Joystick	£6.52	£7.50
Games paddles (pair)	£11.74	£13.50
GAMES		
Programmers Aid cartridge	£30.39	£34.95
Machine Code Monitor cartridge	£30.39	£34.95
Introduction to Basic (1)	£13.00	£14.95
"Avenger" (ROM)	£17.35	£19.95
"Star Battle" (ROM)	£17.35	£19.95
"Jelly Monsters" (ROM)	£17.35	£19.95
"Super Lander" (ROM)	£17.35	£19.95
"Road Race" (ROM)	£17.35	£19.95
"Rat Race" (ROM)	£17.35	£19.95
"Blitz" cassette	£4.34	£4.99
BOOKS		
Learn Computer Programming with the Commodore VIC	£1.95	No VAT
VIC Revealed	£10.00	No VAT
VIC 20 Programmers Reference Guide	£14.95	No VAT
VIC Computing Magazine	£0.95	No VAT

ACCESSORIES

Prince PC31 – 12" Green Monitor **SPECIAL PRICE**	£86.91	£99.95
SANYO		
Slim 3G Cassette Recorder (for use with Nascom)	£26.04	£29.95
CTT 3106 14" Colour TV Set	£199.96	£229.95
ACCUTRAK		
C12 Cassettes	£0.43	£0.50
Single sided, double density disks (for Commodore, Atari, Apple, Tandy etc.)	£1.70	£1.95
Double sided, double density disks (for Sharp and Superbrain)	£2.87	£3.30
Single sided, double density, double track disks (for Nascom and Commodore 8050)	£2.30	£2.65
Disk Bank Interlocking cases for diskettes	£3.91	£4.50
Disk head cleaner	£13.00	£14.95
Single part 11" x 9½" printer paper, box of 2200 sheets	£10.39	£11.95

ALFRETON
Gordon Harwood
69/71 High Street
Alfreton Derbyshire
Tel: 0773 832078

ASHFORD
Ashford Computer Centre
2 Station Road
Clarendon Parade
Ashford Middlesex
Tel: 07842 44955

BASILDON
Godfrey's
28-32 East Walk
Town Centre
Basildon
Essex
Tel: 0268 289379

BASINGSTOKE
Fisher's
2/3 Market Place
Basingstoke
Hants
Tel: 0256 22079

BIRMINGHAM
Sherwoods
Great Western Arcade
Birmingham 2
Tel: 021 236 7211

BRADFORD
Photosave
18 Cheapside
Bradford BD1 4JA
West Yorkshire
Tel: 0274 308598

BRIGHTON
Capricorn
1 Queens Road
Brighton
Sussex
Tel: 0273 29634

CAMBRIDGE
KP Ltd
12a Kings Parade
Cambridge
Tel: 0223 68087

CARDIFF
Randall Cox
18-22 High St Arcade
Cardiff
Tel: 0222 31960

DERBY
C T Electronics
The Spot
Derby
Tel: 0332 44760

GLASGOW
Victor Morris Ltd
340 Argyle Street
Glasgow G2
Tel: 041 221 8958

GUILDFORD
The Model Shop
23 Swan Lane
Guildford
Surrey GU1 4EQ
Tel: 0483 39115

HARROW
Camera Arts
(Micro Computer Division)
24 St Ann's Road
Harrow Middlesex
Tel: 01 427 5469

HATFIELD
Micro World
2 Crawford Road
Hatfield Herts

LEEDS
Bass & Bligh
4 Lower Briggate
Leeds W Yorkshire
Tel: 0532 45445

LONDON SE9
Square Deal
375 Footscray Road
New Eltham
London SE9
Tel: 01 859 1516

LONDON W11
Electroleisure
120 Notting Hill Gate
London W11
Tel: 01 221 7029

MACCLESFIELD
Camera & Computer Centre
118 Mill Street
Macclesfield
Cheshire
Tel: 0625 27468

MIDDLESBROUGH
McKenna & Brown
190 Linthorpe Road
Middlesbrough
Tel: 0642 248345

NEWCASTLE
Turners
29-31 High Friars
Eldon Square
Newcastle
Tel: 0632 612901

NEWCASTLE-ON-TYNE
Newcastle Camera & Computer Mart
16 Northumberland Court
Newcastle-on-Tyne
Tel: 0632 327461

NOTTINGHAM
Cameo Computers
8/9/10 Trinity Walk
Nottingham
Tel: 0602 42912

READING
David Saunders
Computer Centre
8 Yield Hall Place
Reading
Berks
Tel: 0734 580719

TEDDINGTON
"Andrews"
49 Broad Street
Teddington
Middlesex
Tel: 01 977 4716

WALLINGTON
Surrey Micro Systems Ltd
53 Woodcote Road
Wallington
Surrey
Tel: 01 647 5636

WATFORD
SRS Microsystems Ltd
94 The Parade
High Street
Watford
Herts
Tel: 0923 26602

WEST BROMWICH
Bell & Jones
39 Queens Square
West Bromwich
Tel: 021 553 0820

WIGAN
Wilding Ltd
11 Mesnes St
Wigan
Lancs
Tel: 0942 44382

WOKING
Harpers
71-73 Commercial Wa
Woking
Surrey
Tel: 04862 61061

WORCESTER
David Waring Ltd
1 Marmion House
High Street
Worcester
Tel: 0905 27551

we won't be beaten on prices. Just compare them!

nascom

SPECIAL EDITION! UNIQUE TO SPECTRUM

The Nascom is a British designed and built microcomputer and one of the first home micros to appear in this country, some five years ago.

Since then, it has been developed into one of the most powerful and expandable systems around.

It can have up to 206K onboard memory, combined with superb colour graphics, disk drives, printers and various input/output facilities can be added.

Such is the versatility of this micro that it has been adopted for numerous commercial applications including hotel booking systems, blood grouping, weaponry and satellite tracking.

Previously looked upon as a machine for the knowledgeable hobbyist only Spectrum now bring you the opportunity to embark upon this remarkable sphere of computing in the easiest possible way. A ready to plug in and use 'SPECIAL EDITION' Nascom programmable in machine code or BASIC is now available from us.

If you are serious about computing the 'SPECIAL EDITION' is your starter pack. The initial machine provides 8K of memory but a simple plug in board upgrades your computer to 56K.

THE NASCOM 'SPECIAL EDITION'

£429.95

£494.44 INC. VAT

	EXC VAT	INC VAT
THE NASCOM 'SPECIAL EDITION'	£429.95	£494.44
'SPECIAL EDITION' 48K RAM BOARD	£130.00	£149.50

SHARP

£75 OF FREE SOFTWARE WITH THE MZ80A

The MZ80A is the newcomer to the Sharp range with the serious user very much in mind in the design.

A complete stand-alone 48K system incorporating a profiled typewriter keyboard with numeric pad and a 9" green display screen. The "BASIC" contains a number of very useful additions over the previous models.

A full line up of peripherals further add to the versatility of this machine.

INCLUDES £75 OF FREE SOFTWARE.

SHARP MZ80A

£477.38

£548.99 INC. VAT

SHARP PERIPHERALS FOR MZ80A	EXC VAT	INC VAT
* Twin floppy disk unit (5¼")	£590.00	£678.50
* Single floppy disk unit	£400.00	£460.00
* Floppy disk interface card	£100.00	£115.00
* Floppy disk cable	£24.00	£27.50
* Master diskette and manual	£31.00	£35.66
* 80 col printer inc. cable, I/O card and ROM	£415.00	£477.25
* 80 col friction printer, I/O card and ROM	£475.00	£546.25
* 132 col printer, inc. cable, I/O card and ROM	£845.00	£971.75
* Expansion unit (required for disk drive and/or printer)	£100.00	£115.00
* Universal interface card	£45.00	£51.75
* Assembler tapes and manual	£42.00	£48.30
* FDOS	£85.00	£97.75
* MZ80K to MZ80A converter tape	£10.00	£11.50

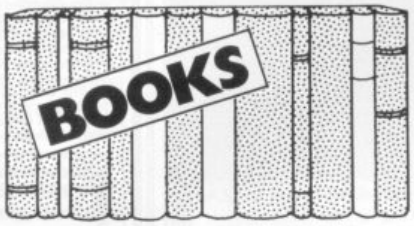
Hand held computers from Sharp give you a pocket genius at your command. We sell the well established PC1211 and the new 1500.

The PC1211 packs high performance functions with Basic language into a slim, compact body. You can extend your PC1211 with a cassette interface or printer/cassette interface.

The new PC 1500 takes technology close to personal computer ability. Its compact body has 16K bytes of ROM and 3.5K bytes of RAM. With an extended alpha basic numeric. You can then go further with the 4K or 8K RAM upgrades. There's also, for the first time in hand held computers, a four colour graphic printer or a combined printer and cassette interface.

	EXC VAT	INC VAT
PC1211 Computer	£65.00	£74.75
PC1211 Cassette interface	£11.26	£12.95
PC1211 Cassette and printer interface	£60.83	£69.95
PC 1500 Computer	£147.78	£169.95
PC 1500 Printer/cassette interface	£130.39	£149.95
PC 1500 4K RAM upgrade	£43.43	£49.95
SHARP PERIPHERALS FOR MZ80K		
* Twin floppy disk unit (5¼") including I/O card, diskette, manual and cable	£702.49 / £378.91	£807.86 / £435.75
* Dot matrix printer	£96.00	£110.40
* Expansion interface (required for either/both above)	£17.57	£20.20
* Machine code language tape and manual	£36.00	£41.40
* Assembler tapes and manual	£40.00	£46.00
* Basic compiler	£40.00	£46.00
* Pascal	£38.00	£43.70
* Double precision basic		

BOOKS



We stock an extensive range of books to help you. Here are just a few to whet your appetite.

CP/M Handbook	£11.50
DON'T	£9.65
Programming the Z80	£11.95
Programming the 6502	£10.75
Your First Computer	£7.75
BASIC Handbook (2nd edition)	£14.95
A-Z of Computer Games	£5.60
Atari Basic	£5.95
Basic 'BASIC'	£9.95
BASIC Computer Games	£6.95
BASIC Computer Programs for Business (VOL I)	£8.55

NO VAT ON BOOKS

STOP PRESS!

Just arriving very limited quantities of the 'Magic'

DRAGON 32K COMPUTER

Sensational Value at

£173.48

£199.50 INC. VAT

Also the first of the Cartridges *from*

£17.35

£19.95 INC. VAT

Cassettes *from*

£6.91

£7.95 INC. VAT

DEALERS: Spectrum Computer Centres operate on an exclusive area basis and if you would like to know more about our group, contact Mike Stern or Alan Warren now on (0727) 66646. Spectrum (UK) Limited, Unit 6, Marlborough Trading Estate, Latimore Road, St. Albans, Herts.

VISA

Prices correct at time of going to press. E. & O. E.

spectrum COMPUTER GROUP

EVERYTHING SPECTRUM OFFER... PLUS

SHARP

We have in stock the full range listed by Spectrum.

PLUS The MZ 80B and a full range of peripherals.

APPLE

Apple II and III Computer Systems in stock and we are an authorised Service Centre for Apple.

PLUS We are an appointed dealer for Jarman Business Systems.

NASCOM

	EXC VAT	INC VAT
Nascom 2 (kit) No user RAM	£225.00	**£258.75**
Nascom 2 (built) No user RAM	£285.00	**£327.75**
Nascom Power Supply (kit)	£35.00	**£40.25**
Nascom Micro-ed 8K Computer	£399.00	**£458.85**
Nascom "Special Edition" 8K Computer	£429.95	**£494.44**
Nascom 3 48K Computer	£499.00	**£573.85**
Nascom RAM B 16K Board (kit)	£80.00	**£92.00**
Nascom RAM B 16K Board (built)	£100.00	**£115.00**
Additional 16K RAM	£15.00	**£17.25**
Additional 32K RAM	£30.00	**£34.50**
48K Add-on Memory Board for "Special Edition"	£130.00	**£149.50**
I/O Board (kit)	£45.00	**£51.75**
PIO Option	£12.00	**£13.80**
CTC Option	£14.00	**£16.10**
UART Option	£16.00	**£18.40**
Nascom Single Disk Drive inc FDC Card	£470.00	**£540.50**

STOP PRESS!

Scoop purchase of manufacturers final stock.

NASCOM IMP Printer complete with 'IMPRINT' ROM.

Previously £325 plus VAT.

Now £199.95 exc. VAT.

£229.95 inc. VAT.

SRS MICROSYSTEMS

94 The Parade, High Street, Watford, Herts.
Telephone (0923) 26602.

YOU'LL VALUE OUR EXPERIENCE, YOU'LL VALUE OUR PRICES. FREE SECURICOR DELIVERY OR POST ON ORDERS OVER £50

THE SYMBOL OF VALUE

NEW LARGER PREMISES

Keen prices and knowledgeable staff have created a need for bigger and better new premises in Watford. Access & Barclaycard welcome. Hire purchase and part exchange available. E. & O.E.

The specialists in internal plug-in memories for ZX computers announce:

80K SPECTRUM

now attainable for the price of a 48k model!! with our SP80 low-power Sinclair look-alike.

Functionally identical to the Sinclair 32K internal plug-in expansion but with double the capacity (64k) the SP80 plugs into the sockets provided on the 16k SPECTRUM by Sinclair for his 32k expansion board. Instructions to our usual high standard makes fitting very simple indeed. The SP80 in no way interferes with Sinclair add ons – ZX Printer, RS232 interface, Microdrive. . .

New low prices on our highly successful internal memories for ZX81

Item	Price	Qty	Total
CHIPSWITCH kit doubles your ZX81 memory to 2K. (this kit requires soldering)	4.70		
INCREMENTAL internal 2K plug-in memory extension for ZX81 expandable to 16K.	17.75		
Additional 2K chips for above (HM6116P-3).	4.50		
MAXIMEM 64K internal plug-in memory for ZX81.	49.95		
MINIMAX 16K version of MAXIMUM upgradeable to 64k with our chip exchange service.	34.95		
SP80 64K internal plug-in memory extension for ZX SPECTRUM giving 80K of user RAM.	50.00		
SP80 Kit version with full instructions	44.00		
SP80 fitting service (price includes excess p&p)	9.00		
Postage and Packing			0.45
TOTAL £			

All prices already include VAT.
Please tick if you require a VAT receipt.
Refunds less £1.50 handling on all items returned within 14 days of receipt. Send stamped addressed envelope plus additional 12½p stamp for catalogue.

To: East London Robotics, 'Finlandia House', 14 Darwell Close, London E6 4BT.
Telephone enquiries on 01-471 3308

Cheque/Postal Order payable to EAST LONDON ROBOTICS £. . . . . .

Name: Mr/Mrs/Miss/Ms. . . . . .

Address: . . . . . .

. . . . . .

STOP PRESS!!! Transfer all your ZX81 BASIC and Machine code programs and data onto your SPECTRUM in minutes with our new SLOWLOADER available soon!!

ZX81 GAMES

from

J.K. GREYE SOFTWARE LTD

THE NEW GENERATION SOFTWARE HOUSE

"Without question the finest machine code games available today"..... J.N. ROWLAND Product Manager for W.H. SMITH.

GAMESTAPE 1 for 1K _____ **only £3.95**
10 Games incl. ASTEROIDS, UFO, CODE, BOMBER, GUILLOTINE, KALEIDESCOPE, etc.
PROBABLY THE BEST VALUE 1k TAPE AVAILABLE.

We've done in 1k, games which some of our competitors require 16k to do!

GAMESTAPE 2 for 16K _____ **only £3.95**
***STARFIGHTER** Superb machine code Space Battle. Set against a background of twinkling stars, with stunning explosions — if you can hit the enemy!
PYRAMID Can you move the Pyramid? Make a mistake and it will collapse! A Thinkers game.
ARTIST The ultimate Graphic Designers aid. 8 Directions, 10 Memories, SAVE, COPY, RUBOUT, CLS, etc.

GAMESTAPE 3 for 16K _____ **only £4.95**
***CATACOMBS** A Multi-Level Graphics Adventure. Each level can contain up to 9 Rooms, 8 Passages, 7 Monsters, Food, Gold, Traps, Phantoms, an Exit (to the next level), and there's an infinite number of levels.
NOTE. . . . This is NOT one of the necessarily limited text Adventures as sold elsewhere.
"An excellent addictive game which will keep you amused for hours.". . . . *COMPUTER & VIDEO GAMES.*

GAMESTAPE 4 for 16K _____ **only £4.95**
***3D MONSTER MAZE** The Game to Top All Others. Unbelievable Graphics! Can you find your way through the Maze? The EXIT is there somewhere, but then so is a T.REX, and its after YOU! All in 3D (the T.REX will actually run towards you in full perspective!), you've never seen anything like this before!
"3D MONSTER MAZE is the best game I have seen for the ZX81". . . COMPUTER & VIDEO GAMES
"If I had to choose just one programme to impress an audience with the capabilities of the ZX81, then J.K. Greye's 3D MONSTER MAZE would be the one without doubt" . . . . ZX COMPUTING. *"Brilliant, brilliant, brilliant!"....POPULAR COMPUTING WEEKLY*

GAMESTAPE 5 for 16K _____ **only £4.95**
***3D DEFENDER** The Ultimate Space Game. Super fast Machine Code 3D version of the Arcade favourite. You have to save your home planet from the marauding Alien Spacecraft. This is all in 3D, your viewscreen shows you the view out of your fighters cockpit window. The backdrop moves when you turn, or fly up or down (8 flight directions), just as if you were really flying it! But then YOU ARE! The Enemy Saucers will actually zoom towards you in 3D, and shoot you if you let them! Your display includes Score, Shield Strength, Altitude, Proximity, Forward Radar and your viewscreen, which shows your rotating home planet, backdrop of Stars, Meteors, Explosions, Plasma Blasts, your Photon Beams, up to 4 Enemy Saucers and of course its all in full 3D!
A SMASH HIT at the ZX Microfair (most of the other software houses wanted a copy), a game not to be missed!

GAMESTAPE 6 for 1K _____ **only £1.95**
***BREAKOUT** Super Fast Full Screen Display Game. Your all time favourite with an added twist. See how much Money you can win and watch the pounds convert to Dollars. All in Machine Code for Fast Action with 3 Speeds, 2 Bat Sizes and three angles of rebound! The best BREAKOUT around and at this price you can't go wrong!

GAMES MARKED * INCL. MACHINE CODE.
Prices include VAT and U.K. P. & P.
(Add appropriate Postage on Foreign Orders). Cheques/P.O.s to

J.K. GREYE SOFTWARE LTD

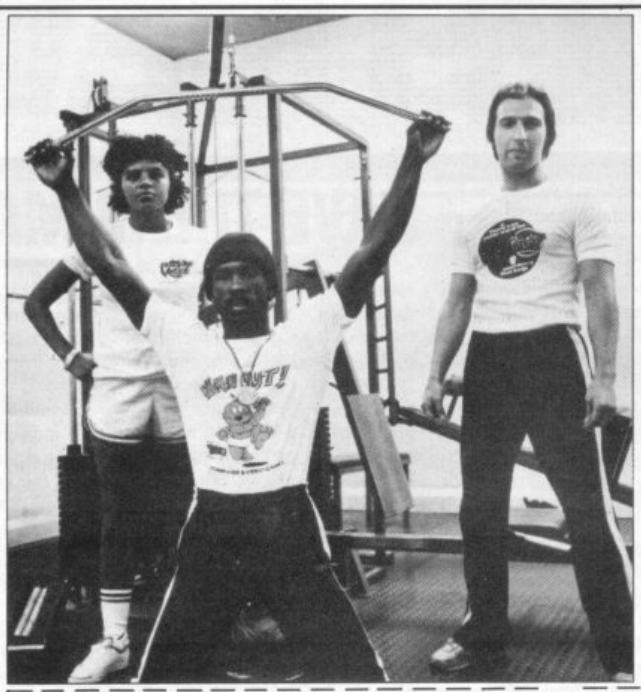
16 Brendon Close, Oldland Common, Bristol BS15 6QE.
CREDIT CARD SALES: Phone: 01-930-9232 (9 a.m. - 7 p.m.)
FOR INSTANT DESPATCH

If you prefer to see before buying, our range of **GAMESTAPES** are stocked by the following stores.

BUFFER MICROSHOP _____ 374A Streatham High Rd., London SW16:
GAMER _____ 24 Gloucester Rd., Brighton;
GEORGES _____ 89 Park St., Bristol, Avon;
MICROSTYLE _____ 29 Belvedere, Lansdown Rd., Bath, Avon;
MICROWARE _____ 131 Melton Rd., Leicester;
SCREEN SCENE _____ 144 St. Georges Rd., Cheltenham, Glos;
W.H. SMITH _____ Over 200 Computer Branches;
ZEDXTRA _____ 5 School Lane, Kinson, Bournemouth, Dorset:

TRADE & EXPORT ENQUIRIES WELCOME

T-SHIRTS



Want to look tough? Well, when you wear a Computer and Video Games T-shirt no-one is going to kick sand in your face! There are three designs to choose from. One is discreet little number with the C&VG logo on the front in delicate shades of red and black. The Bugs feature large on our other two offerings. One features Snag Junior in glorious bright blue with the words "Watch out-there's a Bug about" writ large. Screaming Foul Up has managed to find his way onto our third shirt in brilliant yellow and green with the slogan "There's no polite word for something that bugs!"

The T-shirts come in four sizes, Extra Small, Small, medium and large, and cost £2.65 plus 30p for post and packing. Cheques and or PO's (not cash) should be sent to: Computer and Video Games T-shirt Offer, 10-12 Victoria Road, Northampton.

COMPUTER & VIDEO GAMES T-SHIRT OFFER

Name .....

Address .....

..... Tel .....

Tick Size Reg. ES ☐ S ☐ M ☐ L ☐ Tick Design Reg. 1. "watch out" ☐ 2. "There's no polite word" ☐ 3. "Logo" ☐

T-shirts cost £2.65 plus 30p p&p. Cheques/P.O.s payable to Computer & Video Games T-shirt offer.
OFFER APPLIES U.K. only.

Please return to: Computer & Video Games T-shirt offer, 10-12 Victoria Road, Northampton. PLEASE ALLOW UP TO 28 DAYS FOR DELIVERY.

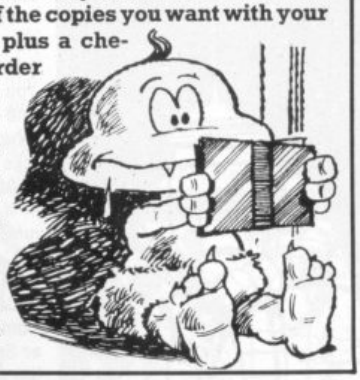
COMPUTER & VIDEO GAMES

BACK ISSUES

Look what you've been missing! Games programs for your favourite machine, news and reviews of those games tapes you've always wanted to know about, plus special features on the latest trends in the exciting world of computers and gaming.

If you would like to catch up on what's been going on in the pages of Computer and Video Games over the past months why not send off for some back issues? It's easy to do.

Just send details of the copies you want with your name and address, plus a cheque or postal order made payable to Computer & Video Games to C&VG Back Issues, Competition House, Fardon Rd., Market Harborough, Leicestershire. Each issue costs £1 including post and packing.



EASIBINDERS

Quick, neat and easy!

It's so easy and tidy with the Easibind binder to file your copies away. Each binder is designed to hold 12 issues and is attractively bound and blocked with the COMPUTER & VIDEO GAMES logo. Price U.K. £4.25 including postage, packing and V.A.T. Overseas orders add 25p per binder.
Nat. Giro No. 5157552.
Please allow 3/4 weeks for fulfilment of order. Payment by ACCESS/BARCLAYCARD/VISA. Send coupon below detailing credit card no. and signature. Why not place your order now? Send the completed coupon below with remittance payable to:-

Easibind Ltd., 4 Uxbridge St., London, W8 7SZ.

Order Form COMPUTER & VIDEO GAMES

I enclose P.O./cheque value ..... for ..... binders
Years required ..... BLOCK LETTERS PLEASE
Name .....
Address .....
.....
Date ..... Registration No. 307469.

GAMES NEWS

I THOUGHT I SAW A PUDDY-CAT!

CAT AND MOUSE

Are you a man or a mouse? Well, you are definitely a mouse in a new game called Cat and Mouse. You crawl around a maze, hiding from two hungry cats who stalk the corridors searching for food. Guess what their favourite food is?

You're right — it's you. So if you don't want to end up as a snack between bowls of Kit-E-Kat, fast reactions are the key to survival.

The number of cats chasing you can be varied. You can choose one or two feline opponents in the chase. There are four different speeds to choose from.

For the advanced player, the game has an added difficulty. The cats are programmed to randomly turn either left or right at maze junctions.

You need to be a very sharp mouse indeed to guess which way the devious moggies are going to turn.

If you manage to successfully negotiate your way out of the maze without being devoured by the cats the game will then select, at random, a new maze. But tread carefully — the cats are still prowling around.

Cat and Mouse is available from Leeds-based Program Power at £4.95 plus VAT and runs on the BBC Model A or B.

SAVE THE HUMANOIDS

DEFENDER

The laser ship is patrolling the rocky terrain of a distant planet, defending and delivering the humanoids from the clutches of the alien landers.

A scanner in the top section of the screen shows the whole plane surface, and can be used for long range reconnaisance. The lower part of the screen displays the section over which the laser ship is flying.

In this new version of Defender the landers hover around, the surface on the lookout for prey which they can drag off into space. As a lander ascends with a humanoid, you can destroy it with your lasers, or with the "smart" bombs, which disintegrate everything hostile in sight.

Having annihilated the lander, you can intercept the plummeting human, before setting him back down on the surface.

Should you fail to rescue the poor individual before the lander craft carrying him reaches the top of the screen, the lander will mutate. While contending with the faster mutants, you are also attacked by bombers, pods, and swarmers, all of which are to be avoided at all costs, and killed before going on to the next wave. But beware of those pods for they release an angry mob of swarmers when you hit them.

If the landers manage to steal away all the humanoids the planet will explode and all the landers become mutants. After every four attack waves you get a new plant, and a new set of humanoids to defend. You have three ships with an extra one ship and smart bomb for scoring 1,000 points.

A very close copy of the arcade version, this Defender runs on the BBC Microcomputer Model B and is available from the Cambridge-based company Acornsoft at a cost of £9.95, inclusive of VAT, postage and packing.

THE MERCILESS METAL MONSTERS

ROBOT CHASE

The robots of Zistel Three are programmed to show no mercy to any aliens found searching the planets barren terrain for a "matter transmitter", which is the only means of escape from this cruel corner of the galaxy.

If the robots catch you, they are programmed to self destruct blowing both you and them to pieces. The robots can be made slower or faster depending on the skill level you select.

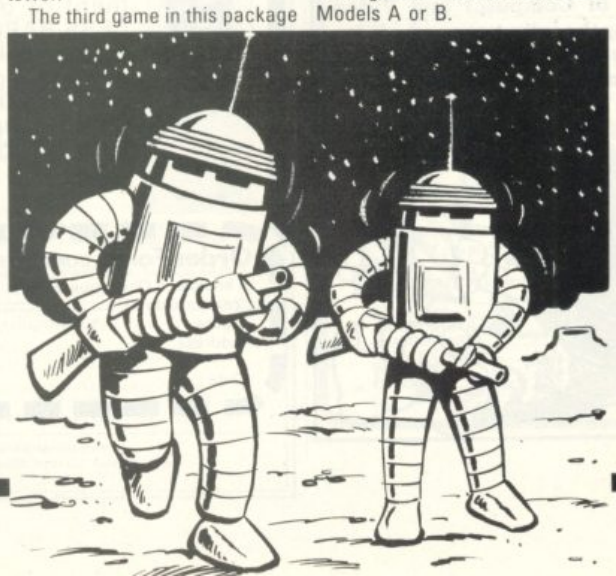
Zistel Three is also ravaged by high voltage electronic winds which blow up from nowhere at very short notice.

If you manage to evade the robots until half time you will be given a Robot Jammer hyper-jump which sends the robot off to a random position. You are also awarded a personal hyper-jump which will randomly place you elsewhere within the game area.

Robot Chase comes with two other space games in a three game pack from Chelmsford-based Futura Software at £3.99.

For your money you also get U.F.O. Invasion where your only defence from invading ships is a tri-beam laser gun mounted high on the top of a sky defence tower.

The third game in this package is Corridor of Lasers, a space age treasure hunt in which you seek for the gold from a long-since extinct planet. It is hidden somewhere in a corridor criss-crossed with laser beams. All three games will run on the BBC Models A or B.



THIS OLD SOLDIER FIGHTS ON

CANNON BALL BLITZ

A belligerent old soldier refuses to leave his wartime enclave high in the Cannon Blitz Hills.

For him the war still rages and he will shower anyone who passes below with cannon balls. You must dodge the cannon balls and escape to the next level where a balloon is waiting to take you out of range.

At the third level of this game — if you get there — you have to jump from platforms onto a moving escalator which takes your little man to the top of the hill.

Cannon Ball Blitz is available from south Croydon-based Spider Software at £19.95 on disc for the Apple II.

Illustrations: Terry Rogers

GAMES NEWS

TALES FROM ARABIAN CAVERNS

ALI BABA

Open Sesame is bound to be a key word to lead you into caves full of treasure in the Apple II fantasy role playing game Ali Baba and the Forty Thieves.

Experience all the mystery and glamour of the Arabian Nights in the search for treasure and adventure.

You will encounter elves, dwarves and even humans during your quest — and of course the rougish thieves will be around and about throughout your adventure. There are 20 random characters lurking around too — and they are mostly evil types. So watch out!

At first you may simply wish to explore the treasure laden caverns and get away with as much stolen treasure as possible. But as you get more skilful — and if you are feeling chivalrous — there's a beautiful princess waiting to be rescued from Ali Baba and his henchmen.

Ali Baba and the Forty Thieves is available from SBD Software of Richmond, and it costs £19.95.

NEW, IMPROVED INVADERS

ZYGIAN INVADERS

The Zygians are a hybrid breed of invader with more than a few tricks up their sleeves.

Unhappy with heavy losses in previous invasions, the Zygians come armed with a new laser beam gun which can hem you in between two ships. Certain of the Zygian ships also have an advanced metal case which enables them to bounce back missiles at your gun turret.

There is also an added innovation in that the mystery space ships that periodically bleep across the screen can't be relied upon to explode when you hit them — some are programmed to drop out of the sky destroying your turret unless you move it swiftly out of the way.

Zygian Invaders runs on a Commodore Pet and costs £6.00 plus VAT from the Brighton-based company, Simple Software.

SAVE YOUR BACON IN THIS MAZE!

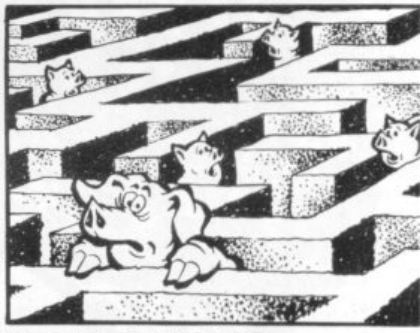
PIGPEN

Porky Pig and her offspring are after you in their maze of a pigpen and they are looking forward to their next meal.

To escape their greedy clutches — or should I say trotters — you have to fill the maze with dots, so restricting their movement.

This novel reverse of the Pacman-type game offers you a choice of one to eight pigs to run away from.

If you successfully fill your maze with dots the game will randomly produce a new maze for you to negotiate. Pigpen is available from Richmond based SBD Software at £17.95 and comes on disk for the Apple II.



BLASTING THE EVIL KLINGONS

TIME TREK

Star Trek fans will welcome the chance to get even with those evil Galactic Pirates — the Klingons — in Time Trek.

While you are waiting for the queues to die down outside your local cinema showing the latest Star Trek movie this game will make a good substitute.

Your Starship Enterprise is armed with photon torpedoes and phasers, which blots out the screen in an energy blast, destroying the Klingons in the process.

The game has 20 different skill levels which change the strengths of the Enterprise and the Klingons phasers.

Unlike many Star Trek games, this version includes all relevant information on one screen presentation. Time Trek comes from Program Power at £7.95 plus VAT for the BBC Model B, or Model A with 32K.

Also new from Program Power this month is an adventure search game called Eldorado Gold.

This is a treasure hunt against a backdrop of saloon bars, six guns, and wild wild women.

Eldorado Gold costs £6.95 plus VAT for the BBC Model B, or the Model A with 32K.

There is also a Pacman type game called Munchyman retailing at £5.95 for the BBC Model B, and a chess program with an educational introduction of a rerun of a challenge match between former chess champions Spassky and Fischer at a cost of £7.95 plus VAT for the Model B.

HARD RAIN IS FALLING

MOONBASE

Moonbase is a peaceful scientific research station on a distant planet. Peaceful, that is, until a sudden meteor shower turns into a relentless onslaught.

As commander of Moonbase the only way to ensure the survival of your crew is to blast the meteors before they can make contact with the base.

You are armed with three angled laser guns so you will have to fire quickly and accurately if the Moonbase is to survive. Moonbase comes on a tape with a 3D maze game from the Great Yarmouth-based company Dk'tronics and costs £5.95.

Illustrations: Terry Rogers

JUST WHEN YOU THOUGHT IT WAS SAFE TO GO BACK TO THE KEYBOARD . . .

ASYLUM II

. . . THE ADVENTURE CONTINUES. The graphics wizardry of Frank Corr and the deadly imagination of William Denman have once again joined forces to produce a world of evil genius. Hordes of maddened army ants will pick your bones. Killer clowns will send you screaming. Clever guards will tax your ingenuity. And a hundred other confrontations with a nightmare world may leave you a babbling idiot.

Graphics are instantaneous and three-dimensional. The building has over 1,500 locations. Full English sentences may be entered, with comprehension surpassing the legendary Asylum I.

You need not have seen Asylum I in order to master Asylum II. You *will* need cunning and stealth to survive this newest world of insanity.

The industry greeted Asylum I with one word. INCREDIBLE. For Asylum II, only one word is required . . . AWESOME!

TRS80 Model I/Model III/Tape: £11.75 Disk: £13.50

ANGLO AMERICAN SOFTWARE CO.

138a Stratford Road, Birmingham B11 1AG. Tel. 021-771 2995

GAMES NEWS

MICKEY'S BIG SCRAMBLE

GAME AND WATCH

Count all your eggs before they're hatched and you could be on your way to a new high score on the latest offering in the Game and Watch series.

Called Mickey Mouse, this game features the original Walt Disney favourite in the frantic action in the hen-house. The four chickens in Mickey's yard put the Goose that laid the Golden Egg to shame, as they keep a constant stream of newly-laid goodies tumbling down the shelves of the coop.

Mickey, armed with a basket and a worried expression has to guess which of his four layers' eggs will next drop from the coop shelves and make sure his basket is underneath it when the egg falls earthwards. Dropping eggs hatch upon landing and when four chicks have got away it's all over.

Minnie is also on hand to shout instruction from a nearby window and ring an alarm bell when the need arises.

Also new to the series is Popeye. The spinach-chomping cartoon hero must catch garbage thrown at him by his ever-loving Olive while balancing precariously on a little boat in the harbour.

Meanwhile, Bluto, the arch villain, tries his best to catch Popeye off-balance and knock him into the water by use of a hammer and his mighty fist. Popeye is open to attack on both sides and even his beloved spinach can't help him as a steady stream of cans, bottles and pinapples arch down from Olive.

A chain of living turtles form the only route across a river and the native bearer has his work cut out carrying baggages across these unstable stepping stones, in a third game new to the series.

The turtles have a habit of diving for the small black fish which rise constantly from the bottom of the river and if the bearer happens to be standing or jumping to a turtle which is heading down, he'll end up in the drink — baggage and all. Even more frustrating is the fact that his colleague has a habit of disappearing on long tea breaks when he ought to be collecting the baggage from your bearer.

All the credit card-sized games are L.C.D. display, on colourful wide screens and double up as watches complete with an alarm. With a high score feature, two versions on each game and a delightful line in fraught expressions, the games are distributed over here by Woodford-based Computer Games Limited and cost £19.95.

QUESTIONS AND ANSWERS

QUIZ MASTER AND MASTERMIND

You'll have to know your onions with the latest batch of cassettes for the VIC-20.

Quiz Master and Mastermind herald a new series of games for VIC owners with an intellectual bent. Both are being released by Commodore which is keeping up its promise to keep the VIC supplied with software at the rate of two or more tapes or cartridges a week.

The Mastermind cassette costs £9.99 and is available for the VIC with 8K of additional memory. This is a "master" tape and comes with two further cassettes. The first holds a set of general knowledge questions and the second a specialised knowledge subject.

Eight further cassettes can be purchased in this range at £1.99 each. These are made up of four more on general knowledge questions and four more specialist subjects: wine and food, music, sports and games, films and television.

The Quiz Master cassette also costs £9.99 and comes in an A5 box complete with an instruction manual. This tape also requires 8K additional memory and enables you to act as a quiz master, setting questions for friends or relatives to answer. It works on a Mastermind format and can store 120 questions.

These are games with an obvious educational bias, but on a purely educational footing come four VIC cassettes aimed at helping schoolchildren with revision.

The titles presently available are English Language, Modern Maths, Traditional Maths and Biology. They cost £9.99 each.

Both this series and the Mastermind series will be expanded with further titles available before Christmas.

THEY CAME FROM UNDER THE GROUND

MOLE ATTACK

Space Invaders may be pretty mean, dragons usually unsociable but when it comes down to the ultimate in villainy any gardener will tell you the creature he fears most, the mole.

Mole Attack brings the tale of this struggle to life in graphic detail, man against lawn wrecker.

It comes in cartridge form for the VIC-20 and the screen becomes a garden full of moles, while you are represented by a gardener figure complete with vermin-bashing hammer.

You get more points for hammering moles as they just appear above ground and no points at all if you allow the little velvet-skinned creatures to make it all the way to the surface.

The game is available in cartridge form for the VIC from Commodore and costs £19.95. Also out is a Sargon II chess program in cartridge form.

First available for the Apple, Sargon and then Sargon II long stayed at the top of the microcomputer chess tree and plays to a high standard.

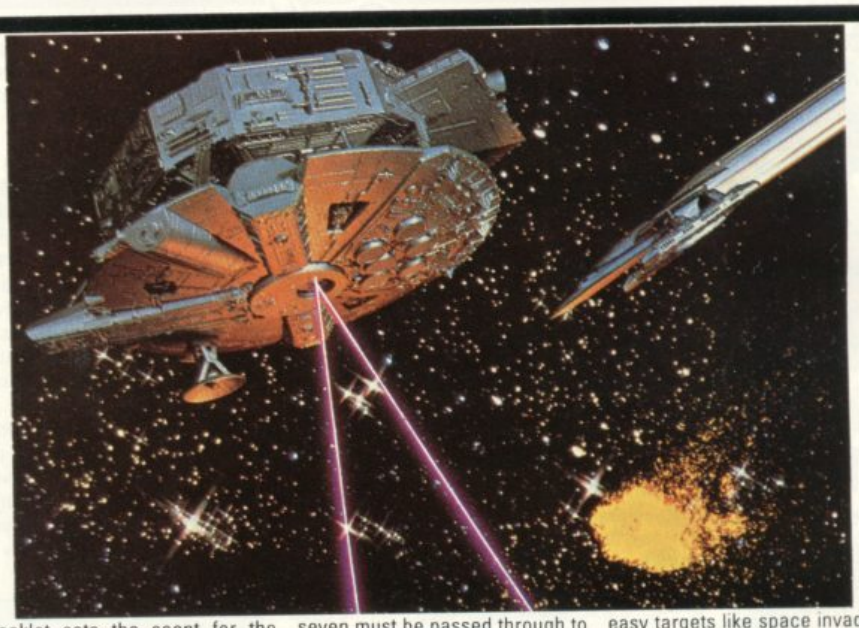
Also out at last and costing £24.95, is a series of five famous adventure cartridges, by Scott Adams: Adventureland, Pirate Cove, Mission Impossible, Voodoo Castle and The Count.

Scott Adams is the first lord of Adventure games and all these five have been tried and enjoyed on many other computers since they were first written.

Illustrations: Jon Davis

JOURNEY TO THE STARS, AND BEYOND

STAR VOYAGER



Star Voyager is the name of the Astro Cruiser from whose command bridge you view the galaxy.

It is also the title of the first of the Imagic cartridge range to be available in this country.

The Imagic range is compatible with Atari VCS and initially seven cartridges have been earmarked for release over here before Christmas.

Star Voyager is a good advertisement for the Imagic range. It is brightly packaged and a well-presented eight page instruction booklet sets the scent for the action and explains the controls and even gives some tips on how to play. It is in full colour with five explanatory screen pictures.

The game itself combines two simple computer space game ideas to produce a thoroughly addictive challenge. Your cruiser has been ordered back to the capital starport which is under attack from Zakor.

Space travel in this galaxy is achieved by jumping through star portals — these appear on your screen as flashing squares and seven must be passed through to win home. They give the double benefit of restoring your ship's energy as it passes through — in fact the sound effects and colours were also found to be quite exhilarating by this pilot.

The catch is that each portal is guarded by progressively more Zakoran ships. These flit around the screen firing white missiles at your ship while you desperately try to align your sights — that is the whole of your ship — on them.

If you are used to blasting easy targets like space invaders, Zakoran fighters will give you a nasty shock, fast and manoeuvring to make it difficult for you.

It really is a struggle for the beginner to achieve even one hit before he or she runs out of energy.

You can fire using lasers, a wide effective range, but energy sapping, or photon torpedoes. You can blast the enemy missiles out of the sky as well.

But with lasers taking 11 points from your energy banks — which are only ever replenished to 99 — every shot must count.

The Zakoran missiles take energy from your shields when they hit and when the energy levels are down to zero you are powerless to fire.

Both enemy ships and portals appear on a small radar screen below the main action.

Star portals must be quickly lined between your sights and through you flash.

At the end of your life the game gives you a field promotion for a good display.

My only tip is to suggest you duck under or around the Zakoran fire and then pull them quickly back into the centre of the screen for a snap shot.

But then, I never even made the rank of lieutenant.

The cartridge costs £18.00 and Imagic's range is distributed in this country by Harrogate-based Adam Imports.

Illustrations: Terry Rogers

ALL TEETH AND SMILES

MUNCH AND CRUNCH

Having munched their way through numerous arcades, and microcomputers, those ever greedy Pacman creatures have now muched their way into the Database TV games centre.

This new version of the popular arcade game introduces Munch and Crunch. Crunch is your little man, and Munch is the equivalent of the ghosts in the arcade game. Munch moves through the maze with an ungainly wobbling motion emitting a curious "boing, boing, boing" noise as he chases Crunch.

If he catches him the game offers the picture of Crunch being hastily consumed by Munch to the sound of loud chomping and slurping.

The game for two players which comes on the same cartridge — there are eight versions in all — is a considerable improvement on the usual Pacman.

In this version you take the part of ghosts and Pacman alternately. If you are controlling the Munchies you can move them using your joystick to any area of the maze, drop them there, and they will then move around randomly in pursuit of Crunch until they find him, or until you move them to another part of the maze.

Another interesting variation is that you are given an energy reading which varies according to the amount of food you can consume and which you will also need to get through the exit at the end of the maze.

Munch and Crunch costs £14.95 and is available from Hertfordshire-based Voltmace.

VIDEO SCREEN

WHIRLYBIRDS FLY IN FOR CHRISTMAS

Christmas is coming and the video games centre stockists are busy planning shelf space for the expected rush.

The Atari VCS owners are benefiting from its position as market leader, as a whole host of other companies are bringing out new cartridges for it.

First into this field were Activision and its next offering is Chopper Command, which puts you into a helicopter flying cover for a convoy of medical supplies when your radar panel bleeps out a warning that enemy copters and jets are in the vicinity.

The Imagic range has another five cartridges coming before January and toy company Palitoy is next into this field with a range of Parker Brothers titles coming from the U.S.

These include a number of licensed copies of popular arcade games and other games which feature characters or a scenario from cult films. Seven cartridges have already been earmarked for release over here.

There's also a new cheaper TV games centre coming onto the market in time for Christmas. The Innovator sells for £69 with a free game cartridge and 22 games ready to choose from.

It is being distributed in Britain by a new name in the electronic toy market, Leisure Zone, which promises a rapidly expanding catalogue of cartridges.

Among the initial 22 are Combat, Nibbleman, Alien Invader, Golf, Othello, Chess, Phoenix, Berserk, Defender and Missile War.

CHOPPER COMMAND

IT'S RIGHT ON CUE

TRICK SHOT

Hurricane Higgins would have to slow down his style if he was to succeed at Trick Shot.

This second Imagic cartridge, to be released in September, offers billiards, an unusual version of pool and a long list of trick shot challenges to master.

The screen shows a green baize table complete with overlarge balls and pockets.

When a player comes to take a shot he lines up a small dot, which represents his cue tip, behind the cue ball. When satisfied that he has positioned it well-enough to make the desired angle, he hits the fire button.

A quick tap on the button will give a weak trickling shot to down those balls hanging over a pocket. But for the Hurricane Higgins specials, around four cushions and almost off the table, the button must be depressed for a longer period before being released.

Five seconds is the maximum power shot possible. A 16 page instruction booklet describes these rules and possibilitites thoroughly.

"English" appears to be the US slang for putting spin on a billiard or pool shot. English is achieved by pushing the joystick in the direction you want the ball to spin. The maximum spin results from a seven second push. When the cue ball strikes another ball or the "cush" it spins in the direction dictated.

Trick shot games line balls up in a set pattern and challenge you to pot them all.

Pool is made up of five racks of three balls each and like English Billiards, is for two players.

Convincing ball movement is achieved by use of a shadow on the balls but the large pockets make it perhaps too easy for miss-hit shots to count.

Trick Shot is for the Atari VCS and costs £20.00 from Adam Imports.

COSMIC CLASSIC

STARMASTER

Activision have won the race to produce an Atari VCS version of the classic Star Raiders game.

Star Raiders first appeared on the Atari 400 and 800 home computers and was thought by many to be the state-of-the-art in computer games.

It is a real-time Startrek game which places the player in the cockpit and allows him to engage the Klingon creatures in a deadly space battle in space above planets and space stations.

Atari themselves have a Star Raiders cartridge due out later this year and the Imagic Star Voyager game (opposite page) is similar though not quite as close a copy.

The screen shows a view from a spacecraft cockpit, complete with an on-board computer display, monitoring energy levels, stardates and ship damage.

Alien fighters and meteor showers block the path through space to the four motherships, which must be preserved from alien attack. Any hits from the fighters will buckle the shields and gradually help to cripple the starship. Meteors can either be dodged or blown out of the way.

Only repairs on a Mothership will enable the starship to become fully functional again but first it must manoeuvre to dock with her.

This game also features cross sights in the centre of the screen. These are fixed in the centre and the whole screen is moved in response to joystick tugging.

This represents the craft moving rather than the guns swivelling as these are supposedly fixed to the wings of the fighter.

The cartridge costs £24.95 and should have already found its way into your Atari cartridge stockists.

MORE MAD METAL MEN

BERSERK

The robots have gone Berserk in this new game for the Atari VCS console.

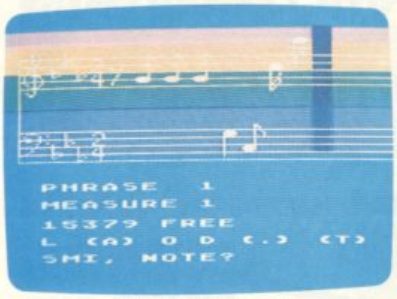
In Berserk you are represented by a small figure on the screen which is faced by rooms full of aggressive robots.

You are armed with a gun which fires only in the direction you are moving and the robots are blasting away too.

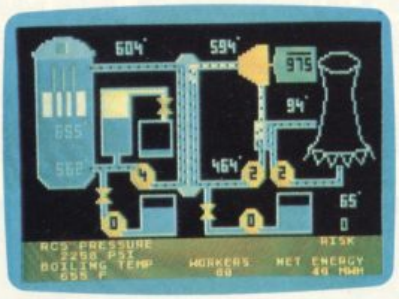
The secret of good Berserk players' success is to judge when discretion becomes the better part of valour and he should make a break for the exit.

This time usually coincides with the appearance of the third character on the game scene. This is Evil Otto, who looks deceptively pleasant.

The game is the latest in the Atari catalogue and makes the transformation from the arcades to the home screen with no noticeable compromises. There are nine variations on the cartridge which costs £29.95.



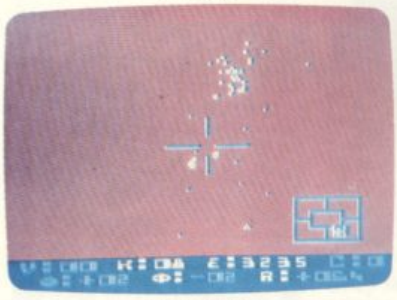
Music Composer



Scram

Graph-it

Intro to BASIC 1



Star Raiders

European Countries

Missile Command

Basketball

3.7 million reasons why the Atari Home Computer is something to see. The display screen used with our computers is composed of 192 horizontal lines, each containing 320 dots. Delivering colour and luminosity instructions to each dot for a second requires 3.7 million cycles...a lot of work for the normal 6502 processor.

That's why the Atari computer has equipped its 6502 with its own electronic assistant. It's called ANTIC, and it handles all the display work, leaving the 6502 free to handle the rest. What this means to you is uncompromisingly spectacular display capabilities without loss of computer power needed to carry out the demands of your program.

That's a quality you just don't find in ordinary home computers. And it's one of the reasons some computer experts say that Atari computers are so far ahead of their time.

There's more...which is what you'd expect from Atari Language. The Atari Home Computer uses several programming languages to give the user maximum control of its extraordinary capabilities. PILOT, Microsoft BASIC and Atari BASIC are understood and spoken by the Atari computer. You'll also find our Assembler Editor cartridge indispensable for machine language programming.

Sound. An Atari computer has four sound generators, or voices, activated by a separate microchip. This leaves the principal microprocessor chips free to perform other tasks. And you can take full advantage of this capability which is designed for easy programming.

Change. Atari Home Computers have been designed to make change and expansion easy. The Atari computer has a modular operating system that can be easily replaced as new technology develops. If you need it, memory expansion requires no more than inserting additional RAM modules.* And the Atari ROM cartridge system also makes it easy to change languages. In short, your Atari computer won't become obsolete by future developments...because it already incorporates the future.

Sharing. To learn more about the amazing capabilities of Atari Home Computers, either visit your local dealer or fill in the coupon below.

THE GRAPHIC DIFFERENCE BETWEEN ATARI® COMPUTERS AND ALL THE OTHERS.

*Atari 800™ computer only.

Please send me FREE a brochure, price list and the address of my nearest stockist.

Name_____

Address_____

_____

_____

_____ CVG 2

Atari International (UK) Inc.
Windsor Hse., 185-195 Ealing Road, Alperton, Wembley, Middlesex.

ATARI®

A Warner Communications Company

CHESS

The endgame is a notoriously difficult task for the chess programmer. "Brute force" chess programs relying mainly on analysis, usually play endgames very badly. However there is a trick which enables some endgames — those with a small number of pieces — to be analysed out completely. This method, which was pioneered by Michael Clarke, a researcher at London University, is based on working backwards progressively from "terminal" positions where the weaker side is checkmated.

The analytic power which can make the best programs extremely dangerous opponents in the middle game is hopelessly weak for endgame play.

As an example, figure one shows an apparently innocuous position in the King and Pawn against King endgame. White's only winning move is K-QB2.

Whatever Black replies White can now eventually promote his Pawn and thus win, but to demonstrate this involves an analysis of no fewer than 27 ply ahead (14 White moves and 13 Black)!

The strong player does not even attempt such analysis. He simply recognises figure one as an example of a class of positions in which White needs to play his King to the far side of the Pawn and selects the right move immediately.

I will illustrate Michael Clarke's method using the endgame King and Rook against King, assuming that White is the side with the Rook.

Figure two is a terminal position — referred to as a win for White at depth zero.

It is obviously possible to write a list of all such positions — or generate it by computer.

Now, for each such position in turn, retract all possible legal last moves for White.

In figure two, White has seven legal "reverse moves", i.e. he may just have moved his Rook from R1, R2, R3, R4, R5, R6 or R7.

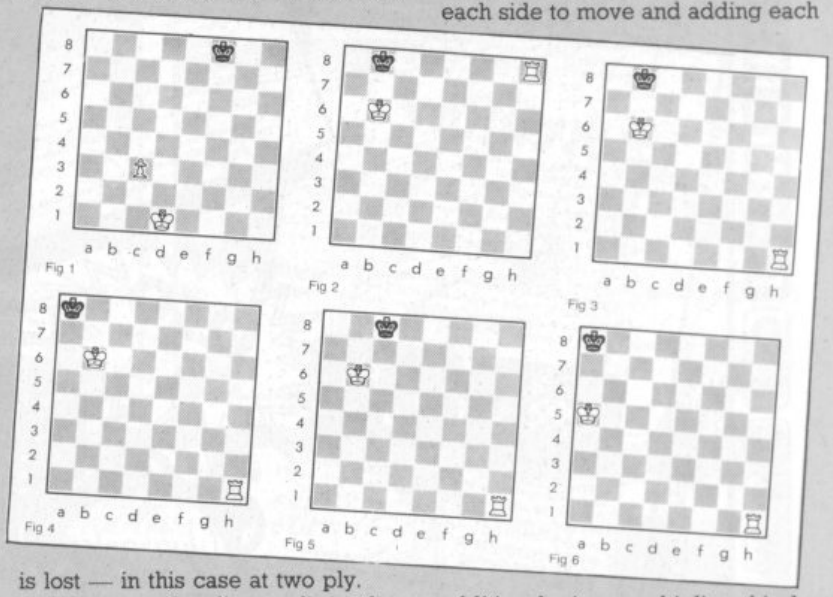
All these positions are forced wins for White in one ply (all White to move of course), of which one is shown in figure three. Finding wins in one ply by reversing moves in this way is known as "backing up".

A complication occurs in trying to back up a further stage to positions which are lost for Black in 2 ply. Retracting a Black move from figure three gives two possibilities, the King may have previously been on QR1 (figure four) or on QB1 (figure five).

The former is a loss in 2 ply but the latter is not (Black to move does not need to commit suicide by moving to QN1, he can escape for a while by playing to Q1 or Q2).

To distinguish between these two cases, a counter is set up initially for every Black to move position of the number of legal Black moves. Whenever a position is generated by reversing a Black move, its counter is reduced by one.

Thus, for figure four, the count is initially one; subtracting one gives zero — indicating that the position



is lost — in this case at two ply.

However, for figure five, the count is initially three; subtracting one gives two — indicating that there are two legal "antecedents" (with King on Q1 and Q2) not yet shown to be losses.

Figure four is included in the collection of losses at depth two ply, and the algorithm proceeds by now reversing all legal White moves to reach that position.

Reversing a Rook move from R2 say does not give a win at depth three (since that position is already included in the set of depth one wins), but reversing a King move from QR5 does (figure six).

The method continues in this way treating White to move and Black to move cases separately.

When retracting a Black move, simply reduce the "legal moves not yet shown to lose" counter of each resulting position by one and include a position as lost only when the counter becomes zero.

When eventually a level is reached from which no new positions are discovered to be won by backing-up, the process terminates and any remaining legal positions are not won for White (e.g. because the Rook is *en prise* to the Black King).

As an indication of what is involved, a four piece endgame has 16 million possible positions with each side to move and adding each additional piece multiplies this by 64.

This number can be reduced by taking advantage of symmetry, but even so it is not likely that endgames with more than five pieces will ever be solved in this way.

However, the potential "targets" include a number of interesting endgames, particularly the classic endgame of King, Rook and Pawn against King and Rook.

BY MAX BRAMER

Attention all BBC & ATOM Owners !!

Acorn ATOM MACHINE CODE PROGRAMS

Dog Fight(12K)
Exciting, two player combat program – in HI RES Graphics. Defend your aircraft carriers and attack your opponents. Engage the enemy fighters in a battle to the death. £5.95

Stock–Car(12K)
HI RES. Two Player contest around any of 16 different race tracks. Steering, acceleration and braking controls. Set the level of difficulty for driver and choose the no. of laps. £5.95

Astro Warrior(12K)
The ASTEROIDS IDEA, but developed and improved !! Flying around the screen you must shoot your way out of difficulty. Aliens attack in increasing numbers. Refuel at specified fuel dumps before you run out. A HI RES game for experts. £5.95

Super Breakout(3K plus 3Kgr plus Fl. Pt.)
NOT just ANOTHER version !! Equally good in colour and black and white, the program has the advancing wall(s) feature plus genuine curved bat action with 6 ball angles. Terrific sound effects make it a MUST for arcade game addicts. £4.95

Swarm(12K)
Alien Killer Bees are swarming the Earth. The Queen Bee is indestructible. Your only hope is to destroy the grubs and new born males before they wipe you out. You get three lives with a bonus at 10000 points. (HI RES graphics).£4.95

ROM SELECTOR BOARD

Suffering from congestion? (PROGRAMMER'S TOOLBOX, WORD PROCESSOR etc.) Switch between up to 4 ROMS located at Hex A000. Assembled and tested unit with compact professionally produced PCB and good quality components. Fits easily into the Utility Socket (IC 24).
Only £19.50

Adventure

ALL THE EXCITING, INTRIGUE AND FRUSTRATION OF A MAIN–FRAME ADVENTURE! 12K
Explore the tortuous forests, dark caverns and castle dungeons. Beware the maze of twisting tunnels and the desert wastelands. Outwit the predators. Rescue the PRINCESS and carry off the treasures.
Great Skill and imagination are required to play this excellent game and you may still never exhaust all the possibilities.
By devising methods of condensing messages, the author has been able to include many features which would otherwise be available only on much larger computers.
Start your adventure now – £7.95

Chess(12K)
Improved graphics, plays black or white, mid game level changes, look ahead up to eight moves, offensive, normal and defensive play. Ten sub–levels, castling, 'En passant' by player. Rejects illegal moves. Take back moves and action replay with take over. Set up problem games. £7.95

Cowboy Shoot–Out(12K)
Full feature, two player, arcade shooting game. Cactus plants, wagons, animated cowboys. Superb graphics and sound. £6.95

Hyperfire(12K)
Aliens have over–run six planets. Object to clear them. Super high–speed action. Four defender ships. Hit alien fuel dumps and alien ships. Aircraft radar shows placement of approaching ships. Thruster control – including diagonal movement. Best sound effects yet! Avoid shots from outside vision scan. £7.95

Air Attack (12K)
Command an East Coast anti–aircraft battery. Destroy enemy fighters, bombers and doodle–bugs. Ingenious graphics depict planes approaching, veering and flying off. Search the sky and scan the landscape through 360 degs. GOOD SOUND, GREAT ENTERTAINMENT. £7.95

Space Fighter(6K 3Kgr)
Super High Speed "Defender" game. Five types of intelligent aliens. Repeating laser cannon, smart bombs, hi–score, rankings, bonus points, six skill levels. Exciting sound effects. £7.95

BBC MICRO

MODEL B (or 32K MODEL A)

Alien Destroyers
Sensational, high speed program with an abundance of features. Brilliant use of colour graphics and sound. 48 strong Invader Fleet of three different types plus Mothership scoring mystery bonus. Choice of six invader speeds and three bomb speeds. Vertical, angled and exploding missiles. Options to replace defences and suppress new fleet advance. Bonus bases awarded each new sheet. Scoring according to overall difficulty level. Ongoing display of score and hi–score and end of game ranking of top five scores.
This program has many unique extras e.g. a 'battle analysis' showing number of each invader shot down, how many Motherships destroyed, number of sheets cleared, shots fired, percentage hits and bases lost.
If you needed a reason to upgrade to 32K, now you have it! £6.95

Timetrek
The ultimate 'real–time' Startrek, with Battle Zone indecision your main enemy. Brilliant colour and sound. 'One–screen' presentation. Twenty skill levels. Panic Button for 'once–only' space leap. Torpedo sight control. A programming masterpiece!! £7.95

Eldorado Gold
Welcome to a past age, when cowboys ruled the roost and Indians terrorised the new settlers. In ELDORADO COUNTY many fortunes were made –and nearly as many lost! Legend has it that Old Bill McCluskey, who met a rather sudden death, had built up a vast treasure somewhere in the nearby territory. Can you end up a rich man where many have failed? If the marauding Apaches or Big Jake's gang don't get you, you may die of thirst in the desert or starve to death in jail. £6.95

World Geography
Beautifully drawn HI RES colour map and graded testing of world capitals and populations, makes learning geographical facts a pleasure. 160 countries covered in total! Pin–pointing of each location in turn aids general awareness. £6.95

Space Maze
You have crash landed in the legendary labyrinth of Titan, inhabited by alien monsters known as 'Froogs'. Find your way out to the 'Transmat' probe before being cornered and eaten. Eight skill levels and 3D colour graphics. £5.95

Astro Navigator
Navigate your way through a variety of treacherous caverns, inhabited by killer rockmites. Avoid the dangers with your climb, dive, reverse and thruster controls. 5 Skill Levels. Top 5 scores ranked. Excellent colour graphics and sound in this exciting 'real–time' game. £4.95

MODEL A or B

Chess
High quality chess game with castling, 'en passant', play black or white, rejection of illegal moves and six levels of play. Set up problem games. £7.95

Micro – Budget
Proven personal finance program which enables you to record, review, analyse and budget your income and expenses for twelve separate monthly periods. Coding system gives sub–totals, selective summary of entries and cumulative cash flow. All figures can be saved to tape. £6.95

Munchyman
Colourful and highly entertaining version of this popular arcade game. Munch your way to a high score, before the 'munchers' devour you. Reverse roles by munching the stars. The more you score, the harder the game gets. £5.95

Other programs available:
Startrek £5.95/Gomoku £3.95/Disassembler £5.95
Cat & Mouse £4.95/Zombies (New) £3.95

WRITTEN ANY PROGRAMS! WE PAY 20% ROYALTIES FOR ATOM, NASCOM & BBC MICRO PROGRAMS

1250 ATOM USERS CAN'T BE WRONG!

WE Guarantee THAT ALL OUR ADVERTISED PROGRAMS HAVE BEEN COMPLETED AND ARE READILY AVAILABLE

PROGRAMMER'S TOOLBOX

(PACKED 4K EPROM) £24.50
★ 1200 BAUD CASSETTE OPERATING SYSTEM
★ VISIBLE LOAD & SAVE

• TRACE (X)	READ	ON ERROR	HEX
• LTRACE	DATA	RENUMBER X, Y	IHEX
• STEP	RESTORE	AUTO X, Y	OFF
FIND	ELSE	CURSOR X, Y	VECTOR
VAR	WHILE	BEEP X, Y	ZERO
LVAR	ENDWHILE	KEY X	POP
DELETE X, Y	DUMP	INKEY $X	STOP

(• VIA chip required)
Suitable for any memory size
Greatly enhances ATOM existing facilities

SPECIAL OFFER
Deduct £1 per cassette when ordering two or more.

MICRO POWER LTD.
8/8a REGENT STREET,
CHAPEL ALLERTON
LEEDS LS7 4PE.
Tel. [0532] 683186

Please add 55p order P & P + VAT at 15%

Please Note:
All programs are now available at all good dealers or direct from MICRO POWER LTD.

MAL FUNCTION
T. HITCH
SNAG JNR
SCREAMING FOUL UP
CONTROL ROOM MONITOR
THE BITS
GAME OF LIFE
GENERA
IT'S A TERRIBLY CRUEL GAME THIS LIFE - JOHN CONWAY HAS A LOT TO ANSWER FOR.
GAME OF LIFE
ALL THOSE LITTLE CELLS OUT THERE... DYING OF LONELINESS IF THEY'RE LEFT ALONE ON THE SCREEN AND BEING STARVED OF SPACE IF THERE ARE MORE THAN THREE NEIGHBOURS.
I'VE DONE IT. A LITTLE LOOP HERE AND A CHANGE OF VARIABLE THERE AND I'VE SAVED THE DYING LIFE CELLS BY PULLING THEM OFF THE SCREEN JUST BEFORE THE NEXT GENERATION IS PLANNED!
SO WHAT WILL HAPPEN TO THEM?
THEY'LL TURN UP.. ER!..... IN THE MEMORY ROOM I SUPPOSE
IN THE MEMORY ROOM.
ZZZZZZZZZ
MEMORY BIN
MEMORY BIN
HUH!
PLOP!
..AND THEN I STARTED TO FEEL REALLY LONELY..!!
MEMORY ROOM
SCRIBBLE! JOT!

```
10 ' ANTIMATTER METEOR CAPTURE
20 ' COPYRIGHT (c) DAVID LANGFORD 1982
30 '
100 'SET UP VARIABLES
110 DEFINTI-M
120 K=20000 ' MAGNETIC COIL FUDGE FACTOR
130 DT=3 ' TIME STEP
140 YM=43
150 YF=44
160 YZ=47
500 ' INITIALIZE DISASTER ROUTINE
510 DATA 33,0,60,54,191,17,1,60,1,255,3,237,176,201
520 X$="" ' THIS STRING WILL HOLD MACHINE CODE FOR WHITEOUT
530 FORI=1TO14
540 READJ
550 X$=X$+CHR$(J)
560 NEXTI
1000 ' INSTRUCTIONS / DIFFICULTY LEVEL
1010 CLS
1020 PRINT@277,"#### ANTIMATTER ####"
1030 PRINT
1040 PRINT
1050 PRINT"USE YOUR SPACECRAFT'S MAGNETIC FIELD COILS TO GUIDE A METEOROID
1060 PRINT"OF ANTIMATTER-IRON SAFE INTO THE CARGO HATCH; IF IT TOUCHES THE
1070 PRINT"HULL OR AN OPERATING MAGNETIC COIL, BEWARE!
1080 PRINT
1090 PRINT"THE COILS ARE NUMBERED 1-9 AND ARE ACTIVATED BY THOSE KEYS; THE
1100 PRINT"WIDER THE CARGO HATCH, THE FEWER COILS ARE AVAILABLE. USE THE
1110 PRINT"ZERO KEY TO DEACTIVATE COILS IF NEEDED.
1120 PRINT
2000 INPUT"SET DIFFICULTY LEVEL (0-20) ";ID
2010 ' SET UP SCREEN AND RANDOMIZE METEOROID POSITION
2020 CLS
2030 PRINT@962,"";
2040 FORI=1TO9 ' WRITE COIL NUMBERS
2050 PRINTI;
2060 IFI<>9THENPRINT"  ";
2070 NEXTI
2080 FORI=0TO42+ID ' DRAW 'HULL' WITH 'CARGO HATCH'
2090 SET(I,44)
2100 SET(127-I,44)
2110 NEXTI
2120 FORI=43+IDTO84-ID ' ERASE NUMBERS UNDER 'HATCH'
2130 RESET(I,45)
2140 NEXTI
2150 X=RND(128)-1 ' RANDOMIZE HORIZONTAL POSITION
2160 Y=RND(15)-1 ' RANDOMIZE VERTICAL POSITION
2170 SET(X,Y) ' DRAW METEOROID
2180 VX=RND(0)/2 ' RANDOMIZE HORIZONTAL VELOCITY
2190 IFX>63THENVX=-VX ' REVERSE IF NEARER RIGHTHAND EDGE
2200 VY=0 ' ZERO VERTICAL VELOCITY
2210 IM=0 ' NO MAGNETIC COILS OPERATING
3000 ' MAGNETIC COIL CONTROL
3010 A$=INKEY$ ' LOOK FOR COIL CONTROL INSTRUCTION
3020 IFA$=""THEN4000
3030 IM=VAL(A$) ' CONVERT TO NUMBER OF COIL
3040 RESET(XM,YM) ' BLANK OUT OLD COIL
3050 IFIM=0GOTO4000
3060 XM=14*IM-7
3070 IFPOINT(XM,44)<>0THENSET(XM,43)ELSEIM=0 ' SHOW CURRENT COIL
4000 ' EQUATIONS OF MAGNETIC FIELD AND MOTION
4010 IFIM=0THEN4100
4020 DX=X-XM ' HORIZONTAL DISTANCE, METEOROID TO COIL
4030 DY=Y-YM ' VERTICAL DISTANCE
4040 Z2=DX*DX+DY*DY ' STRAIGHT-LINE DISTANCE (Pythagoras)
4050 Z1=Z2+1
4060 FZ=K*SQR(Z2)/(Z1*Z1*SQR(Z1)) ' MAGNETOSTATIC EQUATION
4070 TH=ATN(DX/DY) ' ANGLE OF MAGNETIC PULL
4080 VX=VX+FZ*SIN(TH)*DT ' NEW HORIZONTAL VELOCITY
4090 VY=VY+FZ*COS(TH)*DT ' NEW VERTICAL VELOCITY
4100 ' MOTION
4110 XX=X
4120 YY=Y
4130 X=X+VX*DT ' NEW HORIZONTAL POSITION
4140 Y=Y+VY*DT ' NEW VERTICAL POSITION
4150 IFINT(XX)=INT(X)ANDINT(YY)=INT(Y)THEN3000
4160 IFY>YZTHEN5000' CHECK OVERSHOOT
4170 IFX<0ORX>127THEN6000' CHECK ESCAPE OFFSCREEN
4180 IFPOINT(X,Y)<>0THEN6000' CHECK FOR HULL IMPACT
4190 RESET(XX,YY) ' ERASE OLD POSITION
4200 SET(X,Y) ' DRAW NEW POSITION
4210 IFY<YFTHEN3000
4220 IFY<45THEN7000
5000 ' OVERSHOOT CALCULATIONS
5010 XF=XX+(X-XX)*(YF-YY)/(Y-YY) ' WHERE DID IT INTERSECT HULL?
5020 IFPOINT(XF,YF)=0THEN7000' OK IF IN CARGO HATCH
6000 ' DISASTER! WHITE OUT SCREEN
6010 POKE16526,PEEK(VARPTR(X$)+1)
6020 POKE16527,PEEK(VARPTR(X$)+2)
6030 I=USR(1) ' WHITEOUT
6040 FORI=1TO100 ' ADDITIONAL FANCY TOUCHES
6050 POKE15359+RND(1024),128+RND(62)
6060 NEXT
6070 GOTO1000
7000 ' VICTORY!
7010 PRINT@128,"CONGRATULATIONS! YOU HAVE STEERED AN ANTIMATTER METEOROID
7020 PRINT"SAFELY INTO YOUR CARGO HOLD AT DIFFICULTY LEVEL";ID
7030 FORI=1TO1500 ' TIME DELAY
7040 NEXTI
7050 PRINT@64,""
7060 PRINT
7070 PRINT
7080 IFY<=YZTHENRESET(X,Y)
7090 GOTO8070
8000 ' METEOROID ESCAPED OFFSCREEN: INDICATE AND RESTART
8010 FORI=1TO30
8020 PRINT@345,"M I S S E D !"
8030 FORJ=1TO30
8040 NEXTJ
8050 PRINT@345,"             "
8060 NEXTI
8070 RESET(XX,YY) ' ERASE OLD METEOROID
8080 RESET(XM,YM) ' CLEAR MAGNETIC COIL
8090 GOTO2150
```

Warning: This program may damage your health!

Fancy some explosive entertainment? Then program in this listing. It explores one of the mysteries of the universe — antimatter. DAVID LANGFORD braves the dangers and brings you a run-down on how to make space travel with your micro more realistic.

You are invited on a deadly mission to the heart of the asteroid belt . . .

SF buffs will be well aware of the perils of antimatter, that stuff whose atoms consist of positively charged anti-electrons circling nuclei of negatively charged anti-protons. In tiny quantities it's an interesting scientific curiosity; a large piece would be sudden death.

When matter meets antimatter they annihilate one another, converting mass to energy with near 100 percent efficiency — as compared to 0·5 percent maximum efficiency in a hydrogen bomb.

One kilogram of matter plus one kilogram of antimatter would annihilate with the explosive force of nearly 43 million tons of TNT.

Naturally such lethal stuff would have uses in weaponry and power plants, and if it could be found floating free in space, people would soon be taking risks to "mine" it. The classic approach is found in Jack Williamson's SF novel *Seetee Ship*. With little electromagnetic coils you entice meteoroids of anti-iron towards you and tow them through space — making sure they never get too close!

Illustration: Terry Rogers.

Antimatter: In tiny quantities it's interesting — larger amounts can cause a few problems

This could be the basis of many nerve-racking computer games. My sample program printed here gives a fairly simple version. As usual in this column, it's not offered as a perfect and polished game but as something to set you thinking about *your* version. So although the listing is for a TRS-80, the idea is transplantable to any machine.

In this version, meteoroids appear and move with random speed across the screen. At the bottom, a solid white line represents the hull of your spacecraft — if the antimatter meteoroid should even touch it, multi-megaton disaster follows.

In the hull is a cargo hatch — whose width depends on the "difficulty level" chosen — and beneath are numbers corresponding to the positions of your electromagnets. Pressing one of the keys 1 to 9 causes the appropriate magnetic coil to be turned on — only one can be used at a time — and pressing the zero key turns it off. If the meteoroid can be guided into the hatch, then automatic magnetic fields will store it safely.

What's interesting is that these electromagnets don't operate, as you might think, by the inverse-square law — meaning that the pull drops by a factor of four when the meteoroid is twice as far away. It's more like inverse-fourth-power, with the magnetic pull dropping by a factor of about 16 when the distance is doubled.

This makes it deadly dangerous to try last-minute course corrections if the meteoroid is near the relevant electromagnet — it'll dive-bomb it at once thanks to the huge pull at close range. My approximation of the magnetostatic equation is spread through lines 4040-4060; all the boring factors like current and number of windings in the electromagnet are bundled together as K in line 120. Make K bigger and your magnets are proportionally more powerful.

If you prefer your meteoroids to be sitting ducks, omit line 2180; if you fancy a little more aggro from them, try changing line 2200 to VY=RND(0)/3.

The sample program doesn't contain much else that's abstruse. The machine-code whiteout is straight from the Tandy manual. There's a bit of elementary trigonometry in lines 4070-4090, splitting up the magnetic pull into horizontal and vertical components so as to make a crude calculation of the changes in the meteoroid's horizontal and vertical velocity; lines 4130-4140 are equally crude about its changing position in space.

You know all you need to know about this meteoroid when you know four variables: horizontal and vertical position, horizontal and vertical velocity. Another couple of variables and you could track it in *three* dimensions . . . but the display would be a problem!

Once again, you are challenged to improve on this rough program. Could it be made faster and more difficult? How about inserting a scoring system — perhaps like baseball, allowing you to ignore a certain number of meteoroids which seem too high or fast to be captured safely? What if the electromagnets could be switched to *repel*? Impossible: but this is science *fiction*! Or if the program dealt with more than one meteoroid at a time?

Give it a try; let your imagination run riot; and let's hope all those multi-megaton antimatter explosions won't be injurious to the health.

Read this ad

You: "Darling, I've decided to buy a computer."

Her: "***++**??!!***@XX??££**??!!? off!"

You: "Yes, I know we could do with a new washing machine. But the new Dragon 32 Computer is much more important. It's the first computer actually designed for all the family - and it costs under £200!"

Her: "***++??!!@££??! fortune!"

You: "No, I'm not being selfish. Computers are for the whole family - and they're going to play a big part in the children's future."

Her: "Oh?"

From this point on, the conversation should follow more reasonable lines. Allowing you to fully explain the many advantages of the new Dragon 32 family computer.

32K RAM FOR UNDER £200.*

For a start, the Dragon offers 32K RAM. Your wife may not understand that, so just tell her that the Dragon's capabilities are truly massive - at least twice as powerful as its competitors, with some features you won't find even in more expensive units. The Dragon will give you all the power you're likely to need, and more, to create your own programs - along with an exciting range of software which can do anything from helping with kids' spelling and arithmetic to creating your own cartoons.

THE FIRST FAMILY COMPUTER.

All of which brings you nicely to the point where you tell your wife just how much fun the kids will have with the Dragon. How it will save her all that money on those Space Invader machines. How it will magically translate simple typed instructions into beautiful drawings and designs using set, line, circle, draw, scale, rotate and paint features, in up to 9 colours - and play and compose

*Television not included in price.

to your wife.

SPECIFICATIONS
6809E MICROPROCESSOR. Pet, Apple, Atari 400, BBC Micro, and VIC 20 still have the less powerful 6502.
32K RAM (as standard). At least twice the power of similarly priced machines. Expandable to 64K RAM.
EXTENDED MICROSOFT COLOUR BASIC (as standard). Featuring: ADVANCED GRAPHICS (set, line, circle, paint, print, draw, rotate and print using). ADVANCED SOUND 5 octaves, 255 tones. AUTOMATIC CASSETTE RECORDER CONTROL. FULL EDITING with INSERT and DELETE.
9 COLOUR, 5 RESOLUTION DISPLAY.
USE WITH ANY U.H.F. TV and/or separate P.A.L. monitor.
PROFESSIONAL QUALITY KEYBOARD. Typewriter feel. Guaranteed for 20 million depressions.
PRINTER (Centronics parallel).
JOYSTICK CONTROL PORTS.

with 5 octaves of music. How it will engross your children in mind-boggling adventures in dungeons and caves without even getting their knees dirty. And the Dragon works with any U.H.F. TV.

THEY'LL LEARN AS THEY PLAY.

And then you can casually point out that although the kids are having fun, they're also learning. And within a very short space of time, the whole family will be completely at home with programming - with computer language - with every aspect of how computers work. Which can't do their future prospects any harm at all.

BRILLIANTLY SIMPLE INSTRUCTION MANUAL.

The Dragon is made in Britain, designed with the help of British Universities. And it's also worth remembering that the Dragon's instruction manual is clearer and easier to understand than any other home computer's.

That its top-quality keyboard is as easy to use as a typewriter, and so well made it's guaranteed for twenty million depressions.

TAKE THE FAMILY DOWN THE HIGH STREET.

And if she still wants to know more, take her to see the Dragon 32. It'll soon be available in most good stores - or you can send the coupon for further details.

And if you're one of our many lady readers, please accept our apologies.

Perhaps you'd like to read this ad to your husband.

DRAGON 32

The first family computer.

To: Jean Webster, Dragon Data Ltd., Queensway, Swansea Industrial Estate, Swansea, Glamorgan SA5 4EH.
Tel: 0792 580651.

Please send me further information about the Dragon 32.

Name _____

Address _____

_____

_____

_____ CV

A member of the Mettoy Group of Companies.

STAR WAR

The rebel ship hurtles through space in a desperate race for life. Behind the already damaged ship an Empire star-fighter stalks its victim.

The rebel space captain is seeking the sanctuary of the ringed planet Zargon. Once in orbit the rebel ship will be safe from the Empire fighters' laser blasts. One added complication is that the rebels have run into a fierce meteor storm which threatens to destroy their damaged craft.

Can you help steer the crippled ship through the storm to safety? All you have to do is blast the meteors with your laser cannon — using the shift and repeat keys.

Ten hits by meteors on the rebel ship will prove fatal. May the Force be with you!

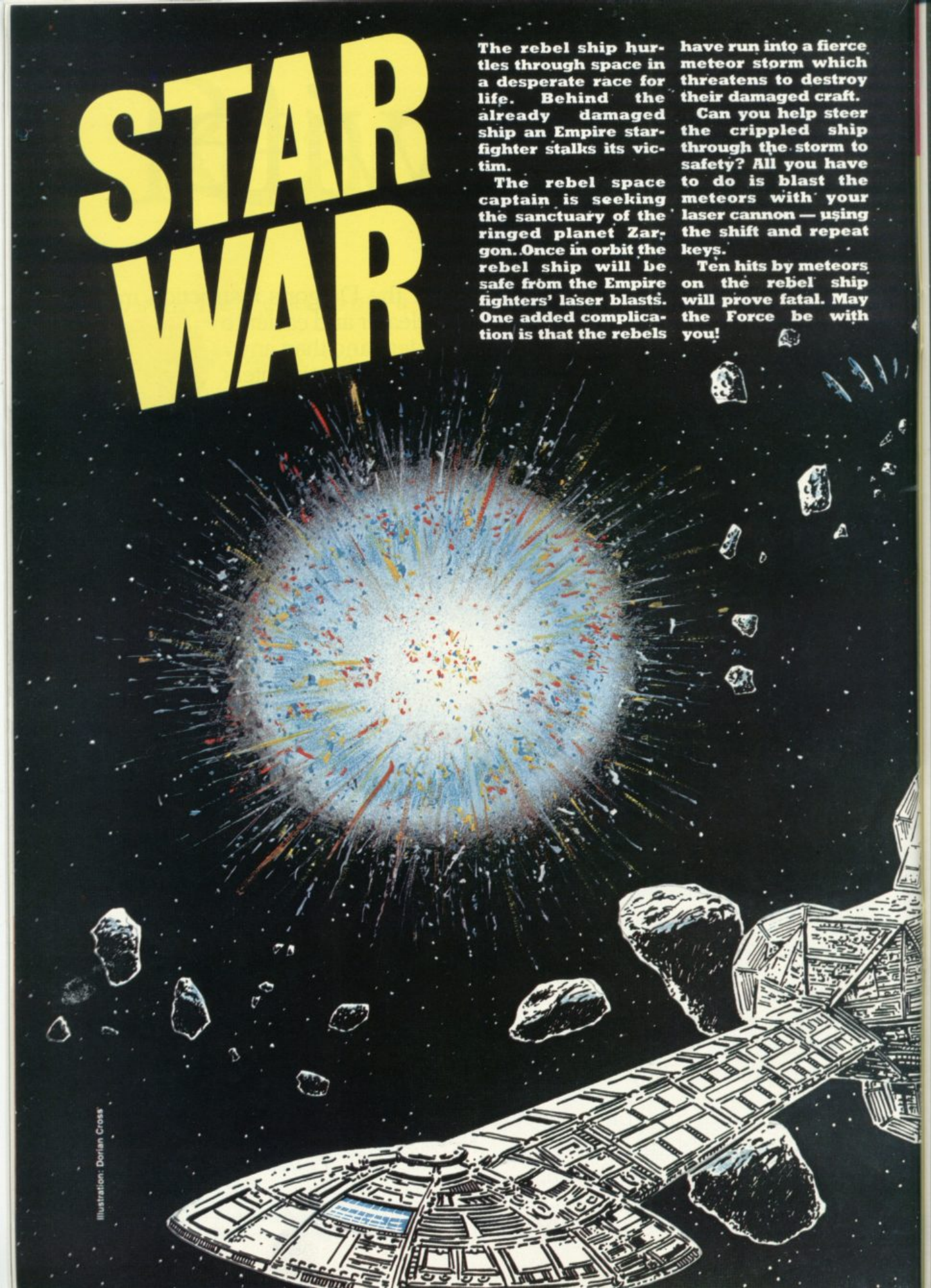
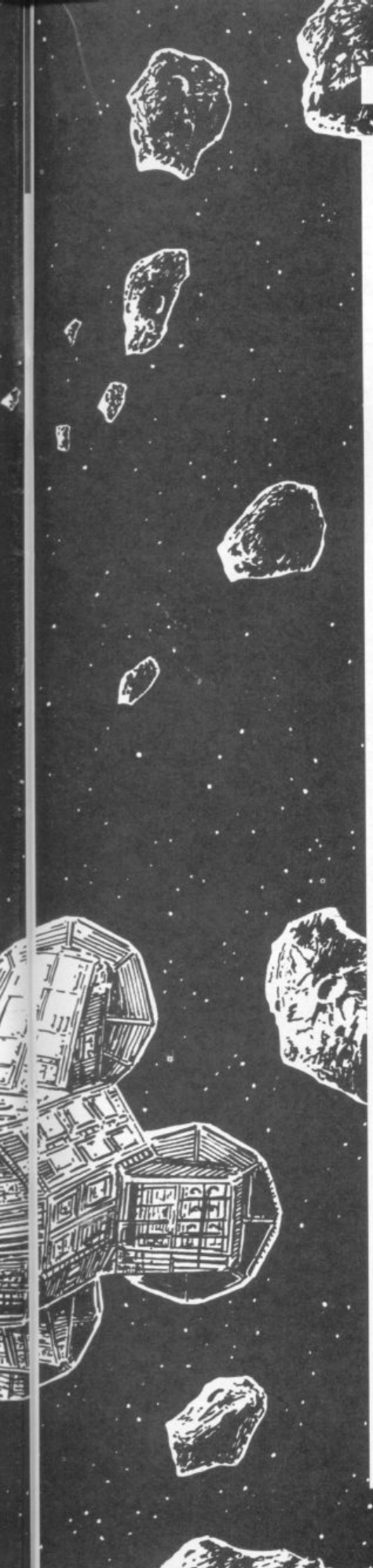


Illustration: Dorian Cross



RUNS ON AN ACORN ATOM BY J. C. FLOWER

```
 5 REM  star war  c1982 J FLOWER.
 7 GOTOt
10vA=ABSRND%(128);B=ABSRND%(96-10)+10;F=ABSRND%(10);E=0
12 G=57;H=1;I=5;Y=0;W=0
14 CLEAR2
16 FORS=1 TO140;PLOT13,(ABSRND%(128)),(ABSRND%(96));NEXT S
18iQ=13;GOSUBk;GOSUBn
20 N=13;GOSUB9;GOSUBf;GOSUBJ;N=15;GOSUB9
22  N=13;GOSUBe;GOSUBJ;GOSUBn
24 GOSUBJ;Q=15;GOSUBk;GOSUBl;Q=13;GOSUBk;GOSUBn
26 N=15;GOSUBf;N=13;GOSUBd;GOSUBJ;N=15;GOSUBe;N=13;GOSUBc
28 GOSUBJ;Q=15;GOSUBk;GOSUBl;Q=13;GOSUBk;GOSUBn
30 GOSUBJ;N=15;GOSUBd;N=13;GOSUBb;GOSUBJ
32 GOSUBJ;GOSUBn
34 N=15;GOSUBc;N=13;GOSUBa;GOSUBJ
36 GOSUBJ;GOSUBn
38 N=15;GOSUBb;N=13;GOSUBh;GOSUBJ;N=15;GOSUBa;GOSUBh
40 Q=15;GOSUBk;GOSUBl
42 GOTOi
44aPLOTN,59,59;PLOTN,63,61;PLOTN,67,61;PLOTN,71,58
46 PLOTN,71,55;PLOTN,70,51;PLOTN,67,50;PLOTN,60,51;R.
48bPLOTN,53,63;PLOTN,59,68;PLOTN,69,69;PLOTN,77,63
50 PLOTN,79,56;PLOTN,76,46;PLOTN,71,42;PLOTN,54,45
52 PLOTN,51,53;R.
54cPLOTN,44,68;PLOTN,55,77;PLOTN,70,80;PLOTN,86,68
56 PLOTN,90,57;PLOTN,84,38;PLOTN,76,32;PLOTN,46,39
58 PLOTN,40,52;R.
60dPLOTN,35,74;PLOTN,50,87;PLOTN,71,89;PLOTN,95,73
62 PLOTN,100,57;PLOTN,91,32;PLOTN,80,23;PLOTN,39,32
64 PLOTN,30,52;R.
66ePLOTN,26,80;PLOTN,103,79;PLOTN,110,69;PLOTN,99,26
68 PLOTN,84,14;PLOTN,31,26;PLOTN,20,50;R.
70fPLOTN,18,85;PLOTN,112,85;PLOTN,121,60;PLOTN,107,19
72 PLOTN,88,5;PLOTN,23,18;PLOTN,10,50;R.
74gPLOTN,10,90;PLOTN,120,90;PLOTN,113,13;PLOTN,16,13;R.
76hPLOTN,65,55;R.
78iFORX=1TO2 ;WAIT;NEXTX;R.
80kPLOT Q,A,B;PLOT Q,A,(B+1);PLOT Q,A,(B+2);PLOT Q,A,(B+3)
82 PLOT Q,A,(B+4);PLOT Q,A,(B+5);PLOT Q,A,(B+6)
84 PLOT Q,A,(B+7);PLOT Q,(A+1),(B+3);PLOT Q,(A+2),(B+2)
86 PLOT Q,(A+2),(B+3);PLOT Q,(A+2),(B+4)
88 PLOT Q,(A+3),(B+1);PLOT Q,(A+3),(B+2);PLOT Q,(A+3),(B+4)
90 PLOT Q,(A+3),(B+5);PLOT Q,(A+4),(B+1);PLOT Q,(A+4),(B+2)
92 PLOT Q,(A+4),(B+4);PLOT Q,(A+4),(B+5)
94 PLOT Q,(A+5),(B+2);PLOT Q,(A+5),(B+3);PLOT Q,(A+5),(B+4)
96 PLOT Q,(A+6),(B+3)
98 PLOT Q,(A+7),B;PLOT Q,(A+7),(B+1);PLOT Q,(A+7),(B+2)
100 PLOT Q,(A+7),(B+3);PLOT Q,(A+7),(B+4);PLOT Q,(A+7),(B+5)
102 PLOT Q,(A+7),(B+6);PLOT Q,(A+7),(B+7)
104 E=E+1;IFE>F AND Q=13 THEN GOSUBm
106 R.
108lIF A<55 THEN A=A+3
110 IF A>65 THEN A=A-3
112 IF B<35 THEN B=B+4
114 IF B>45 THEN B=B-4
116 IF A>=55AND A<=65 THEN A=ABSRND%(128)
118 IF B>=35AND B<=45 THEN B=ABSRND%(96-10)+10
120 R.
122mMOVE(A+3),B;DRAW(A+3),0;WAIT;WAIT;WAIT
124 IF(A+3)>G AND(A+3)<(G+8) THEN P.$7;Y=Y+1
126 WAIT;WAIT;PLOT7,(A+3),B;WAIT;WAIT
128 F=ABSRND%(10);E=0
130 R.
132nT=?#B002;T=T!#BF;IFT=#BFTHENI=7;GOSUBo;G=G+3;I=5
134 T=?#B001;IFT=#7FTHENI=7;GOSUBo;G=G-3;I=5
136 IFT=#FF THEN I=5
138 IFG>=120THEN G=1
140 IF G<=0 THEN G=120
142oMOVEG,(H+1);PLOTI,G,H;PLOTI,(G+8),H;PLOTI,(G+8),(H+1)
144 MOVE(G+4),(H+1);PLOTI,(G+4),(H+4)
146 IFY=10THENFORN=#8000TO#9000STEP4;!N=-1;NEXTN;CLEAR0
148 IFY=10THENP.$30;P."YOU HAVE BEEN VAPORISED"'';GOTOx
```

Calisto Computers Ltd.

119 JOHN BRIGHT STREET

BIRMINGHAM

021-632 6458

ATARI 400 with Basic language **249.95** without Basic language **£199.95**	**ATARI 800** with Basic language 16K **£499.95**	**ATARI 810** Disc Drive with DOS II **£299.95**	**ATARI 410** Cassette Recorder **£50.00**
ATARI 400 32K **£339.90**	**ATARI 800** with Basic language 48K **£579.95**	**32K UPGRADE** for ATARI 400 **£89.95**	**LE STICK** **£25.00**

ARCADE GAMES		
ASTEROIDS	ROM	£29.95
BASKETBALL	ROM	£24.50
MISSILE COMMAND	ROM	£29.95
PAC-MAN	ROM	£29.95
SPACE INVADERS	ROM	£29.95
SUPER BREAKOUT	ROM	£24.50
MOUNTAIN SHOOT	16k (c)	£12.50
REFLECTIONS	16k (c)	£12.50
ANGLE WORMS	16k (c)	£12.50
LUNAR LANDER	24k (c)	£12.50
REARGUARD	16k (c)	£16.50
REARGUARD	(d)	£16.50
JAW BREAKER	(c or d)	£23.95
FROGGER	(c or d)	£31.50
PROTECTOR	32k (c or d)	£23.00
CHICKEN	16k (c or d)	£23.00
DODGE RACER	16k (c or d)	£19.25
NUKE SUB/GALAXY DEF	16k(c)	£16.50
NUKE SUB/GALAXY DEF	(d)	£20.20
KRAZY SHOOTOUT	ROM	£29.95
SHOOTING GALLERY	16k (c)	£16.75
RACE IN SPACE	16k (c)	£16.75
GHOST HUNTER	16k (c)	£19.95
GHOST HUNTER	(d)	£19.95
ALIEN SWARM	16k (c)	£21.95
ALIEN SWARM	(d)	£25.50
HOTFOOT	16k (c)	£13.80
GALACTIC CHASE	16k (c)	£15.95
GALACTIC CHASE	(d)	£20.25
AIR STRIKE	16k (c)	£15.95
AIR STRIKE	(d)	£18.95
ADVENTURE GAMES		
ADVENTURELAND	24k (c)	£16.50
PIRATE ADVENTURE	24k (c)	£16.50
MISSION IMPOSSIBLE	24k (c)	£16.50
VOODOO CASTLE	24k (c)	£16.50
THE COUNT	24k (c)	£16.50
STRANGE ODYSSEY	24k (c)	£16.50
MYSTERY FUNHOUSE	24k (c)	£16.50
PYRAMID OF DOOM	24k (c)	£16.50
GHOST TOWN	24k (c)	£16.50
SAVAGE ISLAND PART I	24k (c)	£16.50
SAVAGE ISLAND PART II	24k (c)	£16.50
GOLDEN VOYAGE	24k (c)	£16.50
ZORK I	(d)	£30.95
ZORK II	(d)	£30.95
DEADLINE	(d)	£39.50

ACCESSORIES	
850 INTERFACE MODULE	£135.00
16k RAM BOARD (800)	£40.00
16k RAM PACK (800)	£65.00
32k RAM PACK (800)	£115.00
32k UPGRADE (400)	£89.95
PADDLES (Pair)	£13.95
JOYSTICKS (Pair)	£13.95
DOS 2 MASTER DISKETTE	£21.95
BLANK DISCS (Each)	£3.00
BOOKS AND MANUALS	
DOS 2 MANUAL	£5.95
DE-RA ATARI	£17.00
MASTER MEMORY MAP	£4.95
SOFTWARE	
WORD PROCESSOR	£99.95
INVITATION TO PROGRAMMING 1	£15.95
INVITATION TO PROGRAMMING 2	£22.95
INVITATION TO PROGRAMMING 3	£22.95
CONVERSATIONAL FRENCH	£39.95
CONVERSATIONAL GERMAN	£39.95
CONVERSATIONAL ITALIAN	£39.95
CONVERSATIONAL SPANISH	£39.95
MINI WORD PROCESSOR 32k (c)	£9.95
KIDS 1 16k (c)	£9.95
KIDS II 16k (c)	£9.95
BOBS BUSINESS 16k (c)	£9.95
GRAPHICS MACHINE (d)	£13.50
PLAYER PIANO 16k (c)	£9.95
TUTORIALS	
DISPLAY LISTS 16k (c)	£13.95
HORIZONTAL & VERTICAL SCROLLING 16k (c)	£13.95
PAGE FLIPPING 16k (c)	£13.95
BASICS OF ANIMATION 16k (c)	£13.95
PLAYER MISSILE GRAPHICS 32k (c)	£19.95
SOUNDS 16k (c)	£13.95
BUSINESS AND UTILITIES	
CCA DATA MANAGEMENT (d)	£101.00
TEXT WIZARD (d)	£99.95
CHARACTER GENERATOR 16k (c)	£15.95
3-D SUPERGRAPHICS 40k (c or d)	£39.99
K-DOS	

GAMES SOFTWARE		
COMPUTER CHESS	ROM	£24.50
VIDEO EASEL	ROM	£24.50
STAR FLITE	32k (c)	£16.50
STAR FLITE	(d)	£20.25
SUNDAY GOLF	16k (c)	£12.50
GALACTIC TRADER	32K (c)	£16.50
GALACTIC EMPIRE	32k (c)	£16.50
MISSION ASTEROID	(d)	£22.25
WIZARD & PRINCESS	(d)	£29.50
ULYSSES & THE GOLDEN FLEECE	(d)	£31.95
CROSSFIRE	(d)	£23.95
MOUSATTACK	(d)	£31.50
THRESHOLD	(d)	£31.95
ACTION QUEST	(c or d)	£19.50
ANALOG ADVENTURE	(d)	£18.99
CRYPTS OF TERROR	16k (c)	£21.95
CRYPTS OF TERROR	(d)	£25.50
CRUSH, CRUMBLE, CHOMP	32k (c)	£22.45
DRAGONS EYE	(d)	£18.75
RICOCHET	16k (c)	£14.95
STAR WARRIOR	32k (c)	£29.95
TEMPLE OF APSHAI	32k (c)	£29.95
UPPER REACHES OF APSHAI	32k (c)	£14.95
RESCUE AT RIGEL	32k (c)	£22.45
INVASION ORION	24k (c)	£18.75
DATESTONES OF RYN	32k (c)	£14.95
MURDER AT AWESOME HALL	16k (c)	£12.95
INTRUDER ALERT	16k (c)	£15.99
RINGS OF THE EMPIRE	16k (c)	£15.99
MOVING MAZE	16k (c)	£9.99
CHOMPELO	16k (c)	£10.99
SPACE TILT	16k (c)	£9.99
SPACE TRAP	24k (c)	£12.99
MOONPROBE	16k (c)	£9.99
TRIPLE BLOCKADE	16k (c)	£12.99
STUD POKER	16k (c)	£10.99
NOMINOES JIGSAW	24k (c)	£15.99
MONARCH	16k (c)	£10.99
CRYSTALS	24k (c)	£9.99
TOURNAMENT & 3BALL POOL	16k (c)	£19.50
DARTS	16k (c)	£19.50
CRIBBAGE & DOMINOES	16k (c)	£19.50
BRITISH JIGSAW PUZZLES	16K (c)	£19.50
EUROPEAN JIGSAW PUZZLES	16k (c)	£19.50
NURSERY RHYMES I	16k (c)	£19.50
NURSERY RHYMES II	16k (c)	£19.50

To: CALISTO COMPUTERS LTD, 119 JOHN BRIGHT STREET, BIRMINGHAM.
PLEASE ACCEPT MY ORDER FOR THE FOLLOWING PROGRAMS:-

1. .....
2. .....
3. .....
4. .....
5. .....

Cheque No. .....for £ ..... enclosed.

Please debit my credit card ACCESS/VISA No. .....

Phone orders welcome on 021-632 6458. Signed .....

Calisto Computers Ltd.

Despatch to:

Name: .....

Address: .....

.....

SPECIALISTS IN MICROCOMPUTERS AND SOFTWARE
119 JOHN BRIGHT STREET, BIRMINGHAM B1 1BE
Telephone: 021-632 6458

```
150 T=?#B001;IFT=#BF THEN GOTO9
152 RETURN
154 PLOT5,(G+4),(H+60)
156 MOVE(G+4),(H+4);WAIT;WAIT;PLOT7,(G+4),(H+60)
158 IF(G+4)>A AND (G+4)<(A+7) AND (H+60)>B THENP.$7;W=W+1
160 IF W=40 THEN GOTO4
162 R.
164 P."YOU SCORED "W" HITS",
166 P."YOU NEEDED 40 TO WIN",;END
168 CLEAR0;P.$30;P."*******BATTLE COMPUTER*******",,,
170 P."THE STARFIGHTER IS DESTROYED",,,
172 P."YOU ARE LEAVING HYPERSPACE",
174 P."IN ORBIT AROUND ZARGON",
176 FORN=1 TO 300;WAIT;NEXTN
177 A=#80;!A=#022D80A9;A!4=#4CF9D080;CLEAR2
178 A!8=!#3FE;!#3FE=A
180 X=64;Y=48;MOVEX,Y
182 R=20;G=0;H=0
184 FORZ=0TO128STEP2
186 %T=Z/20
188 %Q=X+(R*COS%T)
190 %S=Y+(R*SIN%T)
192 PLOT5,%Q,%S
194 PLOT5,X,Y
196 NEXTZ
198 G=0
200 FORZ=0TO128 STEP2
202 %T=Z/20
204 R=50
206 GOSUB8
208 IFG=0THENGOSUB2
210 PLOT5,%Q,%S
212 R=30
214 GOSUB8
216 PLOT5,%Q,%S
218 NEXTZ
220 FORE=1TO40;X=ABSRND%(128);
Y=ABSRND%(96);PLOT13,X,Y;NEXT

222 END
224 MOVE%Q,%S;G=1;R.
226 %Q=X+(R*COS%T)
228 %S=Y+(R*SIN%T)/5;R.
229 P.$12"                star"$128"war",
230 P."YOU ARE IN COMMAND OF A REBEL",
232 P."CRUISER BEING PERSUED BY AN",
234 P."EMPIRE STAR FIGHTER THROUGH A",
236 P."METEOR STORM.",
238 P."YOUR SHIP IS ALREADY DAMAGED.",
240 P."STEER YOUR LASER CANNON USING",
242 P." THE SHIFT AND REPT. KEYS AND ",
244 P."FIRE USING CONTROL.",
246 P."TEN HITS DESTROY YOU.",
248 P."YOU MUST ACHIEVE SAFE ORBIT",
250 P."ROUND THE RINGED PLANET ZARGON.",
252 P."MAY THE FORCE BE WITH YOU.",
254 P."HIT SHIFT"
256 W=?#B001
258 IFW=#7F THEN GOTO4
260 GOTO6
262 END
264 X=A+3;Y=B+4
266 FORP=0TO30STEP1
268 T=A.R.%(120);%T=RAD T
270 %U=%T+RAD(120)
272 %Q=X+(P*COS%T)
274 %R=Y+(P*SIN%T)
276 %S=X+(P*COS%U)
278 %T=Y+(P*SIN%U)
280 %A=X+(P*COS%V)
282 %B=Y+(P*SIN%V)
284 MOVE%Q,%R
286 DRAW%S,%T;DRAW%A,%B;DRAW%Q,%R
288 NEXTP;GOTO5
```

Col

RUNS ON A TRS-80 LEVEL 1&2

```
0 REM ESCAPE FROM COLDITZ GAME ( COPYRIGHT S.WILKINSON 6/1981 )
5 CLEAR1000
10 CLEAR750:CLS:PRINT:PRINT
15 PRINTSTRING$(50,' ');CHR$(186);CHR$(144);'          ';CHR$(168)
20 PRINT'  >>  ESCAPE  FROM  C O L D I T Z  <<          ';CHR$(170)
;CHR$(160);CHR$(176);CHR$(188);CHR$(176);CHR$(186);CHR$(187);CHR
$(187);'  ';CHR$(190);' ';STRING$(2,176);CHR$(168);CHR$(175);CHR
$(173);'    ';
30 PRINTSTRING$(43,' ');CHR$(160);STRING$(2,190);CHR$(191);CHR$(
187);CHR$(191);STRING$(3,190);CHR$(188);STRING$(3,191);CHR$(173)
;STRING$(5,159);CHR$(148)
40 PRINT'    = A  TRS-80  ADVENTURE  GAME =            ';CHR$(186);
CHR$(157);CHR$(191);CHR$(174);CHR$(157);CHR$(191);CHR$(174);CHR$
(189);CHR$(191);CHR$(190);CHR$(189);STRING$(2,191);STRING$(5,187
);CHR$(183);CHR$(149)
50 PRINTSTRING$(42,' ');CHR$(144);STRING$(19,191);STRING$(2,189)
;
60 PRINT'     * BY STUART WILKINSON *              ';CHR$(160);CHR$
(168);STRING$(23,191);
70 PRINTSTRING$(36,' ');CHR$(144);' ';CHR$(176);STRING$(25,191);
75 PRINTSTRING$(35,' ');CHR$(184);STRING$(2,189);STRING$(26,191)
;
77 PRINTSTRING$(24,' ');CHR$(160);'     ';CHR$(160);CHR$(168);STR
ING$(2,160);STRING$(31,191);
78 PRINT'           ';STRING$(3,160);' ';STRING$(2,184);CHR$(188)
;CHR$(190);CHR$(189);CHR$(188);CHR$(180);STRING$(2,188);CHR$(190
);CHR$(191);CHR$(190);CHR$(189);CHR$(188);CHR$(190);STRING$(35,1
91);
80 PRINT'   ';STRING$(3,176);CHR$(180);CHR$(184);STRING$(2,188);
STRING$(54,191);
81 PRINTCHR$(180);CHR$(176);CHR$(190);STRING$(61,191);
82 PRINTSTRING$(64,191);:PRINTTAB(15);'= PRESS ANY KEY TO CONTIN
UE =';
83 IFINKEY$=''THEN83
85 CLEAR2000:RANDOM:RESTORE
88 DIMP$(42),D(42,6)
90 FORA=1TO42:READP$(A)
95 FORB=1TO6:READD(A,B):NEXTB,A
100 DIMN$(17),NL(17)
105 FORA=1TO17:READN$(A),NL(A):NEXTA
110 DIMV$(11):FORA=1TO11:READV$(A):NEXTA
115 FORF=1TO14:READA:PW$=PW$+CHR$(A):NEXTF
120 LC=1:DIMGN(17)
125 CLS:INPUT'WOULD YOU LIKE AN INTRODUCTION ';A$
130 IFLEFT$(A$,1)<>'Y'THEN140
131 CLS:PRINTTAB(10);'== ESCAPE FROM <<COLDITZZ>> ADVENTURE =='
:PRINT
132 PRINT'THIS IS A VERY SIMPLE ADVENTURE, THERE ARE NO TREASURE
S
TO BE FOUND, POINTS TO BE SCORED OR WHATEVER.'
133 PRINT'ALL YOU HAVE TO DO IS ESCAPE.
  BEFORE YOU CAN BEGIN AN ESCAPE ATTEMPT, YOU MUST COLLECT
A PERSONAL CIVILIAN ESCAPE KIT.'
134 PRINT'THIS CONSISTS OF :-
(1) A COMPASS
(2) A DOCUMENT
(3) A MAP
(4) A UNIFORM
(5) A MEAL'
135 PRINT'BEWARE OF SEARCHLIGHTS, GUARDS AND WHEN AN >APPEL< IS
SOUNDED, IT IS ADVISABLE TO ATTEND.'
136 IFINKEY$=''THEN136
137 CLS:PRINT'SOME OF THE COMMANDS AVAILABLE ARE :-
GO, GET, DROP, LOOK, OPEN, SAY, INVENT   ..... ETC.'
138 IFINKEY$=''THEN138
140 CLS:PRINT'YOU ARE AT ';P$(LC)
142 TV=0:FORK=1TO17:IFNL(K)=LCANDK<>17ANDK<>10THENTV=-1
144 NEXTK:IFNOTTVTHEN220
150 PRINT'AROUND YOU THERE IS :-'
160 FORK=1TO17
```

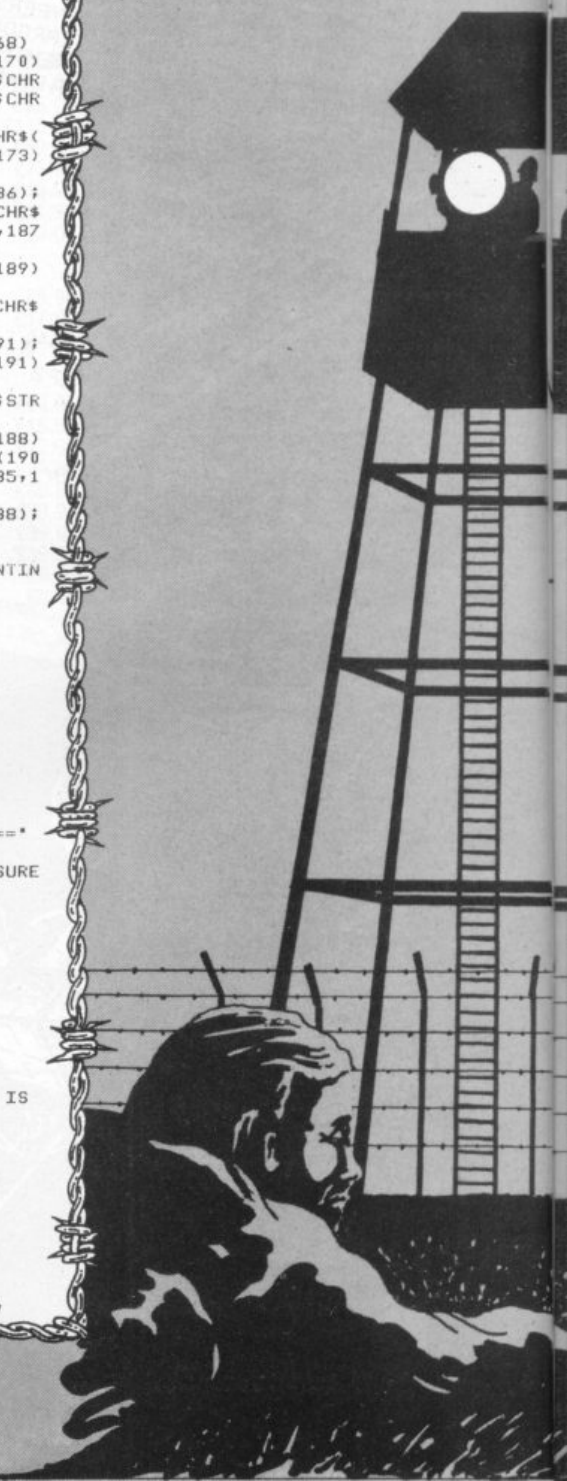


Illustration: Dorian Cross

ditz

&2 IN 16K BY STUART WILKINSON

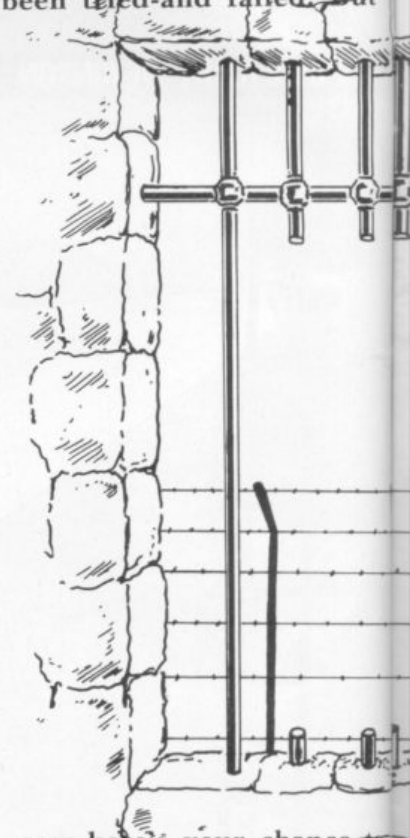
```
170 IF(K=17)OR(K=8)OR((K=10)AND(LC=34))OR((K=12)AND(LC=15))THEN1
90
180 IFNL(K)=LCTHENPRINT"A ";N$(K)
190 NEXTK
220 VB$="":NO$="":C$="":PRINT:INPUT"WHAT SHALL I DO ";C$:IFC$=""
THEN220
230 FORK=1TOLEN(C$):IFMID$(C$,K,1)=" "THEN240ELSEVB$=VB$+MID$(C$
,K,1):NEXTK
235 IFVB$=C$THENNO$=VB$:GOTO245
240 NO$=RIGHT$(C$,LEN(C$)-K)
242 IFVB$="SAY"THEN370
244 IFC$="CUT WIRE"ANDLC=9THEN360
245 IF(NO$="NORTH"ORNO$="WEST"ORNO$="EAST"ORNO$="SOUTH"ORNO$="UP
"ORNO$="DOWN")THEN246ELSE247
246 GOTO1000
247 IFVB$="OPEN"THEN4000
248 IFVB$="READ"THEN380
249 IFVB$=C$THEN270
250 FORK=1TO17:IFN$(K)<>NO$THENNEXTK:PRINT"I DON'T KNOW WHAT A
";NO$;" IS !":GOTO220
255 IFVB$="DROP"THEN350
260 IFNL(K)<>LCANDNOTGN(K)THENPRINT"THERE ISN'T ONE HERE.":GOTO2
20
270 IFVB$="STAB"THEN10000
280 IFVB$="PRESS"THEN10100
290 FORK=1TO11:IFVB$<>V$(K)THENNEXTK:PRINT"I DON'T KNOW HOW TO D
O THAT.":GOTO220
300 IFVB$="LOOK"THEN140
310 IFVB$="INVENT"THEN9000
320 IFRND(60)=23AND(LC>4)AND(LC<>14)AND(LC<>29)THENGOSUB9500
330 IFRND(30)=14AND(LC<>1)THENGOTO9550
340 IFVB$="GET"THEN2000
350 IFVB$="DROP"THEN2500
360 IFVB$="CUT"THEN3000
370 IFVB$="SAY"THEN3100
380 IFVB$="READ"THEN3200
390 IFVB$="HIT"THEN500
500 IFLC=16ANDNO$="WALL"THEN550
510 PRINT"I WOULDN'T DO THAT - YOU MIGHT BRUISE YOUR HAND !":GOT
O220
550 LD(6)=-1:PRINT"A FALSE OAK PANEL SLIDES BACK TO REVEAL -
A SECRET STONE PASSAGE !":GOTO220
1000 IFNO$="NORTH"THENX=1ELSEIFNO$="EAST"THENX=2ELSEIFNO$="SOUTH
"THENX=3
1005 IFNO$="WEST"THENX=4ELSEIFNO$="UP"THENX=5ELSEIFNO$="DOWN"THE
NX=6
1010 IFX=4ANDNOTLD(5)ANDLC=12THENPRINT"A BLANK STONE WALL BARS T
HE WAY WEST.":GOTO220
1015 IFX=2ANDNOTLD(6)ANDLC=16THEN140
1020 IFX=1AND((NOTLD(1)ANDLC=4)OR(NOTLD(3)ANDLC=22))THENPRINT"A
LOCKED DOOR BARS THE WAY NORTH.":GOTO220
1030 IFX=3ANDNOTLD(1)ANDLC=11THENPRINT"A LOCKED DOOR BARS THE WA
Y SOUTH.":GOTO220
1040 IFX=2ANDNOTLD(4)ANDLC=17THENPRINT"A LOCKED DOOR BARS THE WA
Y EAST":GOTO220
1050 IFX=4ANDLC=19ANDNOTLD(2)THENPRINT"A LOCKED DOOR BARS THE WA
Y WEST.":GOTO220
1060 IF(LC=7ANDX=1)OR(LC=17ANDX=2ANDLD(4))OR(LC=28AND(X=1ORX=2))
THEN1070ELSE1110
1070 IFNOTEKTHENPRINT"YOU CAN'T ATTEMPT AN ESCAPE HERE -
YOU HAVEN'T GOT AN ESCAPE KIT !!":GOTO220
1080 IFLC=28AND(X=1ORX=2)ANDNOTGN(7)THENPRINT"YOU'LL NEED A ROPE
 TO GET DOWN THERE !":GOTO220ELSEIF(LC=28ANDX=1)THENPRINT"A SEAR
CH-LIGHT GLARES YOU FULL IN THE FACE !!!":FORF=1TO1000:NEXTF:GOT
O15000ELSEIF(LC=28ANDX=2)THEN16000
1090 IFX=2ANDLC=17THEN15000
1100 IFX=1ANDLC=7THENIFRND(2)=2THEN16000ELSE15000
1110 IFLC=9AND(X=1ORX=4)THENPRINT"AN ELECTRIC BARBED WIRE PREVEN
TS ESCAPE HERE !!":GOTO220
1112 IFLC=27ANDX=1ANDNOTGN(8)THENLC=9:X=6:GOTO1120
```

```
1115 IFLC=21ANDX=5ANDNOTGN(2)THENPRINT"YOU'LL NEED A LADDER TO G
ET UP THERE !":GOTO220
1120 IFLC=9ANDX=6THENPRINT"SUDDENLY A SEARCHLIGHT GLARES YOU FUL
L IN THE FACE !!!":FORR=1TO1000:NEXTR:GOTO15000
1130 IFLC=6ANDX=1THENPRINT"SUDDENLY A GUARD STEPS OUT IN FRONT O
F YOU.":INPUT"WHAT IS THE PASSWORD ";GG$:IFGG$<>PW$THEN15000ELSE
PRINT"O.K. YOU MAY PASS THROUGH.":FORF=1TO750:NEXTF
1140 LC=D(LC,X)
1150 IFLC=5THENPRINT"THE GUARD ON DUTY STOPS YOU.":INPUT"WHAT IS
 YOUR IDENTIFICATION ";ID$:IFID$<>"SHOW CARD"ANDID$<>"PASS CARD"
ANDID$<>"SHOW PASS CARD"ORNOTGN(15)THEN15000
1160 GOTO140
2000 IFCR=7THENPRINT"YOU CAN'T CARRY ANY MORE THINGS !
( PERHAPS YOU COULD DROP SOMETHING ? )":GOTO220
2010 IFNO$="GUARD"ORNO$="WALL"THENPRINT"DON'T BE RIDICULOUS !":G
OTO220
2020 IFNO$="BUTTON"THENPRINT"IT IS FIXED TO THE DESK !!":GOTO220
2030 FORK=1TO16:IFNO$<>N$(K)THENNEXTK
2035 IFGN(K)THENPRINT"YOU'RE ALREADY CARRYING IT !":GOTO220ELSEG
N(K)=-1
2040 PRINT"O.K.":CR=CR+1:NL(K)=0
2045 IFK<>1ANDK<>5ANDK<>9ANDK<>10ANDK<>12THEN2060
2050 IFGN(1)ANDGN(5)ANDGN(9)ANDGN(10)ANDGN(12)THENEK=-1:PRINT"YO
U HAVE NOW GOT YOUR PERSONAL CIVILIAN ESCAPE KIT !"
2060 GOTO220
2500 FORK=1TO17:IFNO$<>N$(K)THENNEXTK
2510 IFNO$="WALL"ORNO$="GUARD"THENPRINT"DON'T BE STUPID !":GOTO2
20
2520 IFNOTGN(K)THENPRINT"YOU'RE NOT CARRYING IT !":GOTO220
2522 IFEKAND(K=1ORK=5ORK=9ORK=10ORK=12)THENPRINT"YOU NO LONGER H
AVE A FULL PERSONAL CIVILIAN ESCAPE KIT.":EK=0
2530 CR=CR-1:NL(K)=LC:GN(K)=0:PRINT"O.K.":GOTO220
3000 IFNOTGN(4)THENPRINT"YOU NEED A KNIFE !!":GOTO220
3010 IFNO$="WIRE"ANDLC=9THENPRINT"AAAAAAARRRRGGHHHHHH !!!!!!!!
10000 VOLTS HAVE JUST RUN THROUGH YOU, CONVERTING YOU INTO A
FRAZZLE !!":END
3020 IFNO$<>"WIRE"THENPRINT"WHAT'S THE POINT IN CUTTING YOUR ";N
O$;" ?":GOTO220
3030 PRINT"O.K.":GN(8)=-1:NL(8)=99:GOTO220
3100 PRINT"O.K.     ";NO$:GOTO220
3200 IFNO$<>"TAG"ANDNO$<>"DOCUMENT"ANDNO$<>"PASS CARD"ANDNO$<>"M
AP"THENPRINT"I DON'T KNOW HOW TO READ A ";NO$:GOTO220
3210 IFNO$="DOCUMENT"ANDNOTGN(5)THENPRINT"YOU DON'T HAVE A ";NO$
:GOTO220
3220 IFNO$="MAP"ANDNOTGN(1)THENPRINT"YOU DON'T HAVE A MAP.":GOTO
220
3230 IFNO$="PASS CARD"ANDNOTGN(15)THENPRINT"YOU DON'T HAVE A ";N
O$:GOTO220
3240 IFNO$="TAG"ANDNOTGN(16)THENPRINT"YOU DON'T HAVE A TAG.":GOT
O220
3250 IFNO$="DOCUMENT"ORNO$="PASS CARD"ORNO$="MAP"THENPRINT"THERE
'S NO POINT IN READING IT.":GOTO220
3260 PRINT"IT SAYS  'DER BEUTELMAUS'":GOTO220
4000 IFNO$<>"DOOR"ANDNO$<>"PARCEL"ANDNO$<>"CUPBOARD"THENPRINT"I
DON'T KNOW HOW TO OPEN A '";NO$;"'":GOTO220
4010 IFNO$="CUPBOARD"THENPRINT"THE CUPBOARD WON'T OPEN - IT'S LO
CKED.":GOTO220
4020 IFNO$<>"PARCEL"THEN4050
4025 IFNOTGN(11)THENPRINT"WHAT PARCEL ???":GOTO220
4030 GN(11)=0:NL(11)=999:GN(12)=-1:NL(12)=0
4035 PRINT"THERE IS A MEAL IN IT !!"
4040 GOTO2050
4050 IFNOTGN(3)THENPRINT"YOU'LL NEED A KEY TO GET THROUGH THAT D
OOR !":GOTO220
4060 IFLC=4ORLC=11THENLD(1)=-1:GOTO4110
4070 IFLC=19ORLC=18THENLD(2)=-1:GOTO4110
4080 IFLC=22ORLC=21THENLD(3)=-1:GOTO4110
4090 IFLC=17THENLD(4)=-1:GOTO4110
4100 PRINT"THERE ISN'T A LOCKED DOOR HERE !":GOTO220
4110 PRINT"O.K. IT'S OPEN.":GOTO220
9000 PRINT"YOU ARE CARRYING :-"          ' INVENTORY
9010 FORK=1TO17:IF(K=12ANDGN(11))ORK=8THENNEXTKELSEIFGN(K)THENIT
=-1:PRINT"A ";N$(K)
9020 NEXTK:IFNOTITTHENPRINT"NOTHING."
9030 IT=0:GOTO220
9500 CLS:PRINT"A GUARD SUDDENLY APPEARS AND SEARCHES YOU ...."
9510 PRINT"HE FINDS :-":TV=0
9520 FORK=1TO16:IFGN(K)THENPRINT"A ";N$(K):TV=-1
9530 NEXTK:IFNOTTVTHENPRINT"NOTHING.  YOU MAY GO FREE.":RETURN
9540 FORA=1TO2000:NEXTA:GOTO15000
9550 CLS:PRINT"          <<<<<<< A P P E L >>>>>>>"
9560 INPUT"DO YOU WANT TO ATTEND ( Y/N ) ";A$
9570 IFLEFT$(A$,1)<>"Y"THEN9610
9580 IFGN(2)THENPRINT"YOU'LL HAVE TO LEAVE THE ";N$(2);" HERE.":
GN(2)=0:NL(2)=LC:CR=CR-1
9590 IFGN(10)THENPRINT"YOU'LL HAVE TO LEAVE THE ";N$(10);" HERE.
":GN(10)=0:NL(10)=LC:CR=CR-1
9595 FORF=1TO1250:NEXTF
9600 LC=1:GOTO140
```

Illustration : DorianCross

Colditz. The name strikes terror into the heart of every prisoner of war. The grim fortress is apparently escape proof. Not even the most experienced escapers have managed to break out from within its imposing walls.

Every way of escape has been tried and failed. But



now here's your chance to achieve the impossible.

But first you have to collect an escape kit. This consists of a map, a compass, some food, a uniform and documents. These items are essential for survival outside Colditz and no escape is permitted without them.

There are 42 rooms to explore and many hazards to avoid. These include searchlights, alarms, spot searches by guards and the "appel" or roll call.

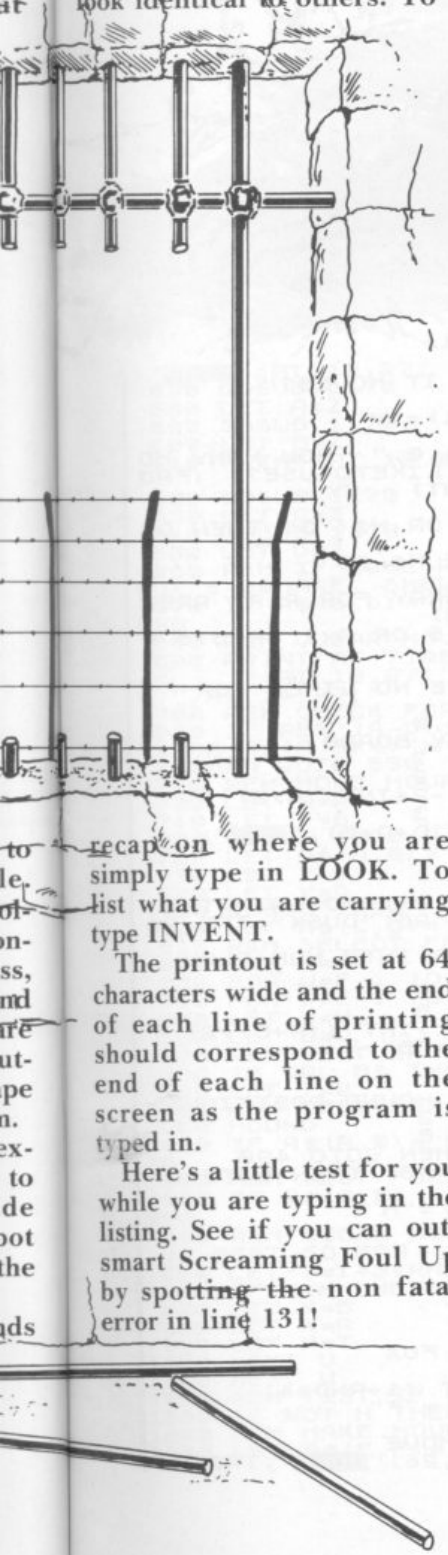
The program understands

two word commands and there is an extensive array of error messages.

The only direction commands you have to use are; north, south, east, west, up and down. If a direction is not possible your previous location will be displayed. But beware. Some locations look identical to others. To recap on where you are simply type in LOOK. To list what you are carrying type INVENT.

The printout is set at 64 characters wide and the end of each line of printing should correspond to the end of each line on the screen as the program is typed in.

Here's a little test for you while you are typing in the listing. See if you can outsmart Screaming Foul Up by spotting the non fatal error in line 131!



```
9610 IFRND(2)=2THEN15000
9620 PRINT"THE GAMBLE PAID OFF.  YOU GOT AWAY WITH IT.":GOTO220
10000 IFNOTGN(4)THENPRINT"YOU HAVEN'T GOT A KNIFE !":GOTO220
10010 IFNO$<>"GUARD"THENPRINT"WHAT'S THE POINT IN DOING THAT ?":
GOTO220
10020 CLS:PRINT" U H H ! ! !
THE GUARD IS DYING .......":FORF=1TO400:NEXTF:PRINT"BUT HE MANAG
ES TO MAKE IT TO THE ALARM BUTTON !":FORF=1TO800:NEXT:GOTO15000
10100 IFNO$<>"BUTTON"THENPRINT"O.K.    SO WHAT ??":GOTO220
10110 INPUT"WHICH BUTTON ? - THERE ARE TWO,
A RED ONE
AND A BLUE ONE ";CL$:IFCL$=""THEN10110
10120 IFCL$<>"RED"THENPRINT"YIPES !!!!  ALARM BELLS ARE RINGING
THROUGHOUT THE PRISON !!!!":FORF=1TO1000:NEXT:GOTO15000
10130 PRINT"A SECRET HIDDEN PANEL IN THE WEST WALL SWINGS ASIDE.
":LD(5)=-1:GOTO220
15000 CLS:PRINT"     <<<   H A N D E   H O C H  ! ! !   >>
>

 A RING OF GERMAN GUARDS ARE POINTING THEIR MACHINE GUNS
AT YOU  ! ! !    YOU HAVE BEEN FOUND GUILTY OF TRYING TO
ESCAPE, AND WILL BE SHOT AT DAWN !!.":END
16000 CLS:PRINT"   ---=== C O N G R A T U L A T I O N S ! ! ! ==
=---

YOU HAVE ESCAPED FROM THE CASTLE SUCCESFULLY !!!!":END
20000 DATA"THE APPEL SECTION OF THE PRISONER'S COURTYARD.",5,10,
2,4,1,1
20001 DATA"THE PRISONER'S COURTYARD.
THERE IS A MANHOLE COVER BY THE WALL.",1,20,24,3,2,40
20002 DATA"THE PRISONER'S COURTYARD.",4,2,25,19,3,3
20003 DATA"THE PRISONER'S COURTYARD.",11,1,3,14,4,4
20004 DATA"THE GUARDHOUSE.",6,8,1,11,5,5
20005 DATA"THE ROADWAY OUT TO THE GATEHOUSE.",7,6,5,9,6,6
20006 DATA"THE GATEHOUSE.",43,7,6,7,7,7
20007 DATA"THE GUARDHOUSE CUPBOARD.",8,8,8,5,8,8
20008 DATA"THE EXERCISE YARD.
BARBED WIRE ELECTRIC FENCES PREVENT ESCAPE HERE.
HOWEVER THERE IS A MANHOLE COVER ON THE FLOOR.",9,6,9,9,9,9
20009 DATA"THE CHAPEL.",10,16,10,1,10,10
20010 DATA"THE CAMP COMMANDER'S OFFICE.",11,5,4,12,11,11
20011 DATA"THE INTERROGATION ROOM.
THERE IS A DESK HERE.",12,11,12,13,12,12
20012 DATA"THE FILING ROOM
THERE IS A FILING CABINET AGAINST THE WALL.",13,12,13,13,13,13
20013 DATA"A SPIRAL STAIRCASE LANDING.",14,4,19,15,29,14
20014 DATA"THE PARCELS OFFICE.",15,14,15,15,15,15
20015 DATA"THE VESTRY.
THE EASTERN WALL IS OAK-PANELLED.",16,17,16,10,16,16
20016 DATA"AN OUTSIDE STORAGE SHED.",17,43,17,16,17,17
20017 DATA"THE TOP OF A FLIGHT OF SECRET STONE STAIRS.",18,19,18
,18,18,37
20018 DATA"THE CANTEEN KITCHEN.
A CUPBOARD IS ON THE WALL.",14,3,19,18,19,19
20019 DATA"THE DENTIST'S SURGERY.",20,20,20,2,20,20
20020 DATA"A DRESSING ROOM.
THERE IS A TRAP-DOOR IN THE CEILING.",21,21,22,21,27,21
20021 DATA"THE STAGE.",21,22,22,23,22,22
20022 DATA"THE THEATRE.",23,22,23,24,23,23
20023 DATA"THE THEATRE.",2,23,24,24,24,24
20024 DATA"THE SICK-BAY.",3,25,25,26,25,25
20025 DATA"THE SHOWER-ROOM.",26,25,26,26,26,26
20026 DATA"A DISUSED STORE ROOM.
A THICK WIRE RUNS ALONG ONE WALL.",28,27,27,27,27,21
20027 DATA"A ROOFTOP.",43,43,27,28,28,28
20028 DATA"THE LANDING OF A SPIRAL STAIRCASE.",32,29,30,36,29,14
20029 DATA"THE OFFICER'S QUARTERS.",29,30,31,30,30,30
20030 DATA"THE ORDERLY'S QUARTERS.",30,31,31,31,31,31
20031 DATA"A BATHROOM.",32,33,29,35,32,32
20032 DATA"THE SENIOR OFFICER'S QUARTERS.",33,34,33,32,33,33
20033 DATA"THE LAUNDRY.",34,34,34,33,34,34
20034 DATA"THE OFFICER'S MESS.",35,32,36,35,35,35
20035 DATA"THE CANTEEN.",35,29,36,36,36,36
20036 DATA"A STONE WALLED TUNNEL.
IT'S PITCH BLACK.",38,37,37,37,18,37
20037 DATA"AN ALCOVE IN THE TUNNEL.",38,39,37,38,38,38
20038 DATA"THE END OF THE TUNNEL.
A RUNG-LADDER LEADS UPWARDS.",39,39,39,38,8,39
20039 DATA"THE END OF A SEWER PIPE.",40,40,41,40,2,40
20040 DATA"A JUNCTION IN THE SEWER PIPE.",40,41,41,42,41,41
20041 DATA"THE END OF THE PIPE.
ABOVE, THERE IS AN IRON-BARRED GRILL.",42,41,42,42,26,42
20042 DATA"MAP",38,"LADDER",22,"KEY",8,"KNIFE",41,"DOCUMENT",13,
"BUTTON",12,"ROPE",27,"WIRE",27
20043 DATA"COMPASS",35,"UNIFORM",34,"PARCEL",15,"MEAL",99,"GUARD
",5,"GUARD",7,"PASS CARD",20,"TAG",31,"WALL",16
20044 DATA"GO","GET","DROP","OPEN","CUT","HIT","SHOW","SAY","REA
D","INVENT","LOOK"
20045 DATA68,69,82,32,66,69,85,84,69,76,77,65,85,83
```

RUNS ON A ZX81 IN 16K

The fox is a cunning creature. It can outwit the most experienced pack of hounds and baffle the farmer who keeps loosing chickens to this swift and silent hunter.

Now you can attempt to trap the elusive animal in this original game for the Sinclair ZX81. You are the master of the hunt, in charge of a ferocious pack of hounds. All you have to do is manoeuvre your hounds into a position to catch the fox around a chess board style display. There's just one problem. The fox is virtually invisible.

It only appears briefly at the start of the chase, when it leaps over one of the pursuing hounds or when a hound attempts to move into the same square which the fox is occupying. The program includes an easier version of the game for beginners which allows the player to see the fox whenever it moves. But we know Computer and Video Games readers don't like things too easy — do you!

Although the entire program is written in Basic the response time is rapid. Slow mode is used apart from the initial setting up of the board, giving a constant and flicker free display.

The game is won once the fox is trapped. Out you lose if the fox escapes to the bottom of the screen. As master of the hunt you can choose how many hounds you wish to use in the chase — any number from three to eight. This gives a considerable range of difficulty.

The program inputs are error trapped, and non-valid inputs simply result in the input being requested again.

BY GORDON STEVENS

```
  10 RAND
  20 REM RESERVE LINES FOR BASIC
 IN LOWER SCREEN
  30 POKE 16418,2
  40 CLS
  50 PRINT TAB 10;"""FOX AT DUSK
"""""""" TRAP THE FOX SO IT CANNO
T MOVE.FOX AND HOUNDS MOVE ONE S
PACE   DIAGONALLY UP OR DOWN, BU
T THE  FOX MAY LEAP OVER A HOUND
."."   ENTER MOVES COLUMN FIRST
THENTHE ROW.. E.G. 11 IS BOTTOM
LEFTCORNER.",,
  60 PRINT "  AT DUSK THE FOX CA
N ONLY BE   SEEN AT THE GAME STA
RT, WHEN IT LEAPS OVER A HOUND,
OR WHEN A   HOUND TRIES TO MOVE
INTO THE    SQUARE THAT THE FOX
IS IN."''''''"WOULD YOU PREFER
THE EASIER GAMEWHERE YOU SEE THE
 FOX WHENEVER  IT MOVES?"
  70 INPUT B$
  80 LET I=B$(1)="Y"
  90 CLS
 100 PRINT AT 4,0;"  HOW MANY HO
UNDS WOULD YOU LIKETO USE?  (FRO
M THREE TO EIGHT)    "
 110 INPUT H$
 120 IF H$>"8" OR H$<"3" THEN GO
TO 110
 130 LET H=CODE H$-28
 140 FAST
 150 REM SET ARRAY FOR PLAY AREA
 160 DIM A$(8,8)
 170 LET B$="A>8 OR A<1 OR B>8 O
R B<1"
 180 CLS
 190 REM RESERVE NO LINES FOR
BASIC
 200 POKE 16418,0
 210 REM DISPLAY BOARD
 220 FOR A=0 TO 7
 230 FOR B=0 TO 2
 240 LET D=3*(A-2*INT (A/2))
 250 FOR C=0 TO 3
 260 PRINT TAB (D+C*6);"▒▒▒";
 270 NEXT C
 280 NEXT B
 290 NEXT A
 300 PRINT AT 2,25;"FOX AT";TAB
25;"▒▒▒▒▒▒";TAB 26;"DUSK";TAB 26
;"▒▒▒▒▒▒"
 310 REM PUT B"S INTO NON-PLAY
SQUARES
 320 FOR A=1 TO 8
 330 FOR B=1 TO 8
 340 IF (A+B)/2<>INT ((A+B)/2) T
HEN LET A$(A,B)="B"
 350 NEXT B
 360 NEXT A
 370 REM SET UP HOUND POSITIONS
 380 FOR A=1 TO 2
 390 FOR B=1 TO 8
 400 IF NOT H THEN GOTO 490
 410 IF A$(B,A)="B" THEN GOTO 47
0
 420 LET A$(B,A)="H"
 430 LET H=H-1
 440 LET X=B
 450 LET Y=A
 460 GOSUB 1250
 470 NEXT B
 480 NEXT A
 490 SLOW
 500 REM SET UP FOX
 510 LET F=8
 520 LET E=2*INT (1+RND*4)
 530 LET A$(E,F)="F"
 540 GOSUB 1500
 550 REM INPUT MOVE
 560 PRINT AT 7,26;"▒▒▒▒";TAB 26
```

Fox at Dusk

Illustration: Jon Davis

```
;"FROM";AT 10,27;
 570 GOSUB 1170
 580 LET A=Z
 590 GOSUB 1170
 600 LET B=Z
 610 PRINT AT 12,27;"TO";AT 14,2
7;
 620 GOSUB 1170
 630 LET C=Z
 640 GOSUB 1170
 650 LET D=Z
 660 REM IF MOVE ATTEMPTED TO
FOX"S SQUARE, SHOW FOX
 670 IF A$(C,D)="F" THEN GOSUB 1
500
 680 REM CLEAR MOVE DISPLAY
 690 PRINT AT 7,26;"    ";TAB 26
;"    ";AT 10,27;"  ";AT 12,27;"
  ";AT 14,27;"  "
 700 REM CHECK FOR VALID MOVE
 710 IF ABS (A-C)>1 OR ABS (B-D)
>1 OR A$(A,B)<>"H" OR A$(C,D)<>"
" THEN GOTO 550
 720 REM MOVE HOUND
 730 LET X=A
 740 LET Y=B
 750 GOSUB 1330
 760 LET A$(A,B)="  "
 770 LET X=C
 780 LET Y=D
 790 GOSUB 1250
 800 LET A$(C,D)="H"
 810 REM SELECT FOX MOVE
 820 LET M=0
 830 FOR W=F-1 TO F+1 STEP 2
 840 FOR V=E-1 TO E+1 STEP 2
 850 LET A=V
 860 LET B=W
 870 REM TEST IF MOVE OFF BOARD
 880 IF VAL B$ THEN GOTO 1000
 890 LET T=0
 900 REM TEST FOR POSSIBLE LEAP
OVER HOUND
 910 IF A$(A,B)="H" THEN GOTO 13
70
 920 REM TEST FOR VALID MOVE
 930 IF A$(A,B)<>"  " THEN GOTO 1
000
 940 REM SCORE MOVE AND RECORD
 IF BEST SO FAR
 950 LET T=T+3*RND+(B<F)+(B=1)
 960 IF T<M THEN GOTO 1000
 970 LET Y=B
 980 LET X=A
 990 LET M=T
1000 NEXT V
1010 NEXT W
1020 REM TEST IF MOVE POSSIBLE
1030 IF NOT M THEN GOTO 1430
1040 REM MAKE MOVE
1050 LET A$(E,F)="  "
1060 LET A$(X,Y)="F"
1070 REM DISPLAY FOX IF LEAPING
OVER HOUND
1080 LET G=ABS (E-X)>1
1090 IF G THEN GOSUB 1500
1100 LET E=X
1110 LET F=Y
1120 REM TEST IF FOX WINS
1130 IF Y=1 THEN GOTO 1470
1140 REM DISPLAY FOX IF LEAPING
OVER HOUND OR FOR EASY GAME
1150 IF G OR I THEN GOSUB 1500
1160 GOTO 550
1170 REM INPUT FROM KEYBOARD
1180 IF INKEY$<>"" THEN GOTO 118
0
1190 LET C$=INKEY$
1200 IF C$="" THEN GOTO 1190
1210 IF C$>"8" OR C$<"1" THEN GO
TO 1180
1220 PRINT C$;
1230 LET Z=CODE C$-28
1240 RETURN
1250 REM PRINT HOUND
1260 LET Z=3*(X-1)
1270 PRINT AT 3*(8-Y),Z;"/ ";TA
B Z;"  ";TAB Z;"  "
1280 RETURN
1290 REM PRINT FOX
1300 LET Z=3*(E-1)
1310 PRINT AT 3*(8-F),Z;"  ";TA
B Z;"  ";TAB Z;"  "
1320 RETURN
1330 REM PRINT BLANK SQUARE
1340 LET Z=3*(X-1)
1350 PRINT AT 3*(8-Y),Z;"    ";TA
B Z;"    ";TAB Z;"    "
1360 RETURN
1370 REM TEST FOR FOX LEAP OVER
HOUND
1380 LET A=V+(V-E)
1390 LET B=W+(W-F)
1400 IF VAL B$ THEN GOTO 1000
1410 LET T=RND
1420 GOTO 920
1430 GOSUB 1290
1440 PRINT AT 8,25;"YOU WIN"
1450 PAUSE 40000
1460 GOTO 20
1470 GOSUB 1290
1480 PRINT AT 8,25;"I WIN"
1490 GOTO 1450
1500 REM FLASH FOX DISPLAY
1510 FOR A=1 TO 4
1520 GOSUB 1290
1530 FOR B=1 TO 4
1540 NEXT B
1550 PRINT AT 3*(8-F),Z;"    ";TA
B Z;"    ";TAB Z;"    "
1560 NEXT A
1570 RETURN
```

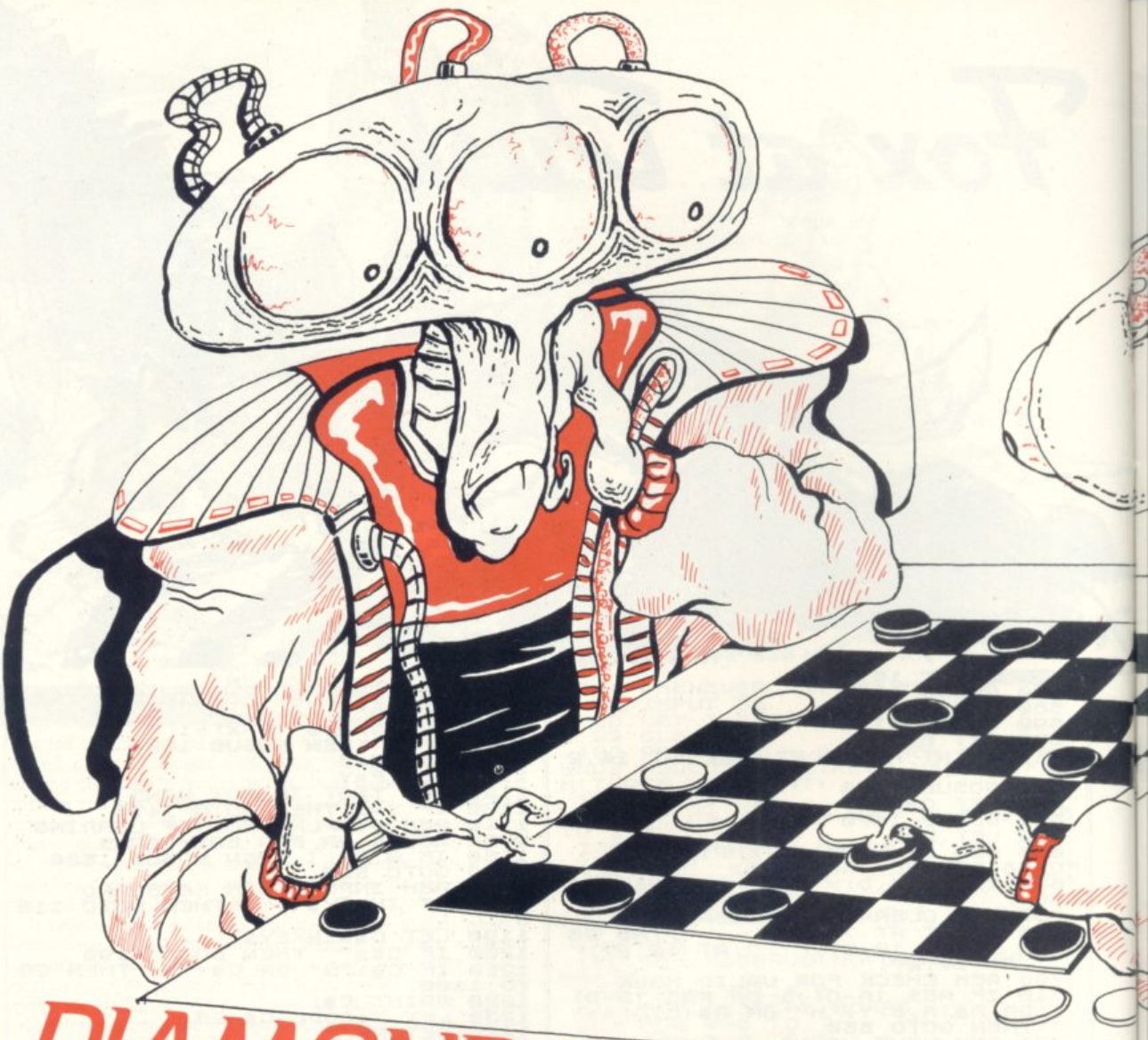


Illustration: Dorian Cross

DIAMOND DRAUGHTS

Fed up with nasty green aliens firing their noisy laser guns at you? Well here's a game that will bring you back to earth. It's a version of that old board game favourite Draughts — as played in pubs, clubs and front rooms across the universe. Maybe those aliens will take a break from destroying the odd planet to enjoy a quick game — if they can lay their tentacles on a Spectrum that is!

The game is for two players. One player uses green counters, the other white. The rules are exactly the same as the regular board game — slip out of your spacesuit, unload the electron gun and enjoy an earth bound game for a change.

BY PAT NORRIS

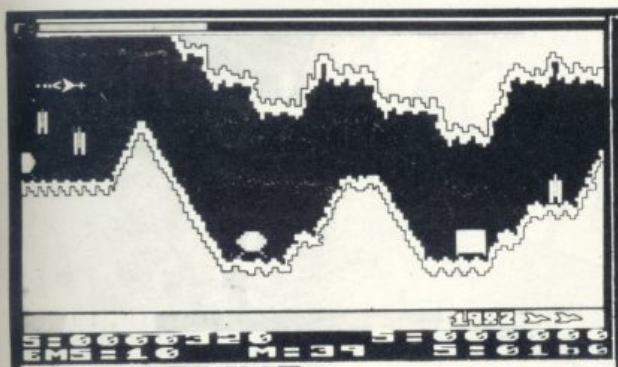
RUNS ON A SPECTRUM IN 16K

```
  2 REM DIAMONDS © 1982 MICROX
  3 GO SUB 600
  4 PRINT INK 2;"Enter VERTICAL
COORD first"
  5 PRINT
  6 PRINT "Score:- White=0    Gr
een=0"
  7 PRINT
  8 GO SUB 900
  9 LET cm=0
 10 LET a$="    "
 15 LET c$="    "
 20 LET b$="    "
 25 LET c=0: LET d=0: LET j=0
 30 FOR a=1 TO 4
 40 PRINT INK 1;c$;a$
 45 PRINT INK 1;c$;a$
 50 PRINT INK 1;c$;b$
 60 PRINT INK 1;c$;b$
 80 NEXT a
 81 FOR a=6 TO 20 STEP 4: PRINT
AT 4,a; PAPER 4; INK 1;"  ";AT
```

```
5,a;"■": NEXT a
  82 FOR a=6 TO 16 STEP 4: PRINT
 AT 6,a; PAPER 4; INK 1;"■";AT
7,a;"■": NEXT a
  84 FOR a=6 TO 20 STEP 4: PRINT
 AT 8,a; PAPER 4; INK 1;"■";AT
9,a;"■": NEXT a
  87 FOR a=6 TO 16 STEP 4: PRINT
 AT 14,a; PAPER 7; INK 1;"■";AT
 15,a;"■": NEXT a
  88 FOR a=6 TO 20 STEP 4: PRINT
 AT 16,a; PAPER 7; INK 1;"■";AT
 17,a;"■": NEXT a
  89 FOR a=6 TO 16 STEP 4: PRINT
 AT 18,a; PAPER 7; INK 1;"■";AT
 19,a;"■": NEXT a
  90 INK 1
  92 PLOT 47,144: DRAW 128,0: DR
AW 0,-128
  95 DRAW -128,0: DRAW 0,128
  96 INK 0
  97 LET l=6
 100 FOR a=1 TO 8
 105 PRINT AT 20,l;CHR$ (a+47);
 107 LET l=l+2
 110 NEXT a
 115 FOR e=1 TO 8
 120 PRINT AT e*2+2,4;e
 125 NEXT e
 130 LET u=RND
 135 IF u>.5 THEN GO TO 410
 200 LET e=0: LET aa=0: LET q=0:
LET s=0: LET z=0: LET p=1: LET
n=b: LET o=bq
 210 PRINT AT 10,25; INK 2;"Whit
es";AT 11,26;"move": GO SUB 215:
 GO TO 224
 215 INPUT "Input from/to (eg.31
42) ";m$
 220 IF LEN m$<>4 THEN GO TO 200
 221 FOR i=1 TO 4
 222 IF (CODE m$(i)<48) OR (CODE
 m$(i)>56) THEN GO TO 200
 223 NEXT i: RETURN
 224 LET m=VAL m$
 235 LET f=INT (m/100)
 236 LET t=INT (m-(f*100))
 237 IF a(t)<>0 THEN GO SUB 242:
 GO TO 200
 238 LET k=f-t: LET s=k: IF ABS
(k)>11 THEN GO SUB 700
 239 IF p=0 THEN GO SUB 242: GO
TO 200
 240 IF ABS (k)<12 AND cm=1 THEN
 GO SUB 860: GO TO 385
 241 GO TO 245
 242 PRINT AT 14,24; INK 2;"INVA
LID";AT 15,25;"MOVE": FOR U=1 TO
 100: NEXT u: PRINT AT 14,24;"
";AT 15,25;"      ": RETURN
 245 IF a(f)=w OR a(f)=wq THEN G
O TO 260
 247 GO SUB 242: GO TO 200
 260 IF a(f)=w AND s<9 OR s=10 O
R s>22 THEN GO SUB 242: GO TO 20
0
 265 IF a(f)=wq THEN LET z=1: GO
 TO 295
 275 LET a(f)=0: LET a(t)=w: GO
SUB 317: GO TO 325
 295 LET a(f)=0: LET a(t)=wq: GO
 SUB 300: GO TO 325
 300 IF k=-18 THEN LET a((t)-9)=
0
 310 IF k=-22 THEN LET a((t)-11)
=0
 317 IF k=18 THEN LET a((f)-9)=0
 320 IF k=22 THEN LET a((f)-11)=
0
 322 RETURN
 325 IF s=18 OR s=-18 OR s=22 OR
 s=-22 THEN LET c=c+1: PRINT AT
2,14;c
 330 IF t=11 OR t=13 OR t=15 OR
t=17 THEN LET a(t)=wq
 333 GO SUB 335: GO TO 340
 335 LET fx=VAL m$(1)*2+2: LET f
y=VAL m$(2)*2+6
 337 LET tx=VAL m$(3)*2+2: LET t
y=VAL m$(4)*2+6
 338 PRINT AT fx,fy; INK 1;"■";
AT fx+1,fy;"■": RETURN
 340 IF ABS (k)>11 THEN GO TO 35
0
 343 GO SUB 345: GO TO 385
 345 IF a(t)=w THEN PRINT AT tx,
ty; PAPER 7; INK 1;"■";AT tx+1,
ty;"■"
 347 IF a(t)=wq THEN PRINT AT tx
,ty; PAPER 7; INK 1;"■";AT tx+1
,ty;"■"
 348 RETURN
 350 GO SUB 345: GO SUB 355: GO
TO 360
 355 IF k=-18 THEN PRINT AT tx-2
,ty+2; INK 1;"■";AT tx-1,ty+2;"
■"
 360 IF k=-22 THEN PRINT AT tx-2
,ty-2; INK 1;"■";AT tx-1,ty-2;"
■"
 365 IF k=18 THEN PRINT AT tx+2,
ty-2; INK 1;"■";AT tx+3,ty-2;"■
■"
 370 IF k=22 THEN PRINT AT tx+2,
ty+2; INK 1;"■";AT tx+3,ty+2;"■
■"
 375 RETURN
 380 IF s=-18 OR s=18 OR s=-22 OR s=22 THEN GO
 SUB 395: IF aa=410 THEN GO TO 385
 382 GO TO aa
 385 LET cm=0: LET s=0: IF c=12
THEN GO TO 800
 390 GO TO 410
 395 PRINT AT 14,24; INK 2;"Is m
ove";AT 15,24;"complete";AT 16,2
4;"(y or n)"
 396 IF INKEY$="" THEN GO TO 395
 397 IF INKEY$="n" THEN PRINT AT
 14,24;"      ";AT 15,24;"
      ";AT 16,24;"      ": LET cm
=1: LET aa=200: RETURN
 398 IF INKEY$="y" THEN PRINT AT
 14,24;"      ";AT 15,24;"
```

```
    ";AT 16,24;"                ": LET aa
=410: RETURN
 399 GO TO 395
 410 PRINT AT 10,25; INK 2;"Gree
ns";AT 11,26;"move"
 415 LET z=0: LET aa=0: LET q=0:
 LET e=0: LET s=0: LET p=1: LET
n=w: LET o=wq
 420 GO SUB 215
 425 LET g=VAL m$
 431 LET f=INT (g/100)
 432 LET t=INT (g-(f*100))
 435 IF a(t)<>0 THEN GO SUB 242:
 GO TO 410
 437 LET k=f-t: LET q=k: IF ABS
(k)>11 THEN GO SUB 700
 438 IF p=0 THEN GO SUB 242: GO
TO 410
 439 IF ABS (k)<12 AND cm=1 THEN
 GO SUB 860: GO TO 560
 440 IF a(f)=b OR a(f)=bq THEN G
O TO 446
 442 GO SUB 242: GO TO 410
 446 IF a(f)=b AND q>-9 OR q=-10
 OR q<-22 OR q=1 THEN GO SUB 242
: GO TO 410
 450 IF a(f)=bq THEN LET e=1: GO
 TO 470
 460 LET a(f)=0: LET a(t)=b: GO
SUB 300: GO TO 492
 470 LET a(f)=0: LET a(t)=bq: GO
 SUB 300
 492 IF q=18 OR q=-18 OR q=22 OR
 q=-22 THEN LET d=d+1: PRINT AT
2,24;d
 494 IF t=80 OR t=82 OR t=84 OR
t=86 THEN LET a(t)=bq
 500 GO SUB 335
 515 IF ABS (k)>11 THEN GO TO 53
0
 516 GO SUB 520
 518 GO TO 560
 520 IF a(t)=b THEN PRINT AT tx,
ty; PAPER 4; INK 1;"▟";AT tx+1,
ty;"▙"
 522 IF a(t)=bq THEN PRINT AT tx
,ty; PAPER 4; INK 1;"▟";AT tx+1
,ty;"▙"
 525 RETURN
 530 GO SUB 520
 540 GO SUB 355
 555 IF q=18 OR q=-18 OR q=22 OR
 q=-22 THEN GO SUB 395
 557 IF aa=200 THEN GO TO 410
 560 LET cm=0: LET q=0: IF d=12
THEN GO TO 820
 565 GO TO 200
 600 DIM a(99)
 601 LET b=-1: LET w=1: LET wq=2
: LET bq=3
 605 LET h=11: LET l=17
 610 FOR c=h TO l STEP 2
 615 LET a(c)=b
 620 NEXT c
 625 IF l=17 THEN LET h=20: LET
l=26: GO TO 610
 630 IF l=26 THEN LET h=31: LET
l=37: GO TO 610
 635 LET h=60: LET l=65
 640 FOR c=h TO l STEP 2
 645 LET a(c)=w
 650 NEXT c
 655 IF l=65 THEN LET h=71: LET
l=77: GO TO 640
 660 IF l=77 THEN LET h=80: LET
l=86: GO TO 640
 665 RETURN
 700 IF k=-18 AND (a((t)-9)=n OR
 a((t)-9)=o) THEN RETURN
 702 IF k=-22 AND (a((t)-11)=n O
R a((t)-11)=o) THEN RETURN
 704 IF k=18 AND (a((f)-9)=n OR
a((f)-9)=o) THEN RETURN
 706 IF k=22 AND (a((f)-11)=n OR
 a((f)-11)=o) THEN RETURN
 708 LET p=0: RETURN
 800 PRINT AT 10,25; INK 3;"WHIT
E "
 802 GO SUB 805
 803 GO TO 830
 805 PRINT AT 11,25; INK 3;"WINS
 ";AT 13,23;"ANOTHER";AT 14,23;"
GAME ?"
 820 PRINT AT 10,25; INK 3;"GREE
N "
 825 GO SUB 805
 830 INPUT g$
 835 IF g$(1)="n" THEN CLS : LIS
T
 840 CLS : CLEAR : RUN 2
 850 STOP
 860 PRINT AT 13,26; INK 2; BRIG
HT 1;"DON,T";AT 14,25;"CHEAT": F
OR v=1 TO 100: NEXT v: BRIGHT 0:
 PRINT AT 13,26;"          ";AT 14,25
;"          ": RETURN
 900 LET ab=BIN 11111111: LET ac
=BIN 11111100: LET ad=BIN 111110
00: LET ae=BIN 11110000: LET af=
BIN 11100000
 901 LET ag=BIN 01111111: LET ah
=BIN 00111111: LET ai=BIN 000111
11: LET aj=BIN 00001111: LET ak=
BIN 00000111
 902 LET ba=ab: LET bb=BIN 11111
110: LET bc=ac: LET bd=BIN 11111001: LET be=BIN 11110
010: LET bf=BIN 11100100
 903 LET bg=ag: LET bh=ah: LET b
i=BIN 10011111: LET bj=BIN 0100
1111: LET bk=BIN 00100111
 910 FOR v=144 TO 151
 915 FOR d=0 TO 7
 920 READ a: POKE USR CHR$ (v)+d
,a
 925 NEXT d: NEXT v: RETURN
 930 DATA ab,ab,ab,al,ac,ad,ae,a
f
 935 DATA ab,ab,ab,ag,ah,ai,aj,a
k
 940 DATA ak,aj,ai,ah,ag,ab,ab,a
b
 945 DATA af,ae,ad,ac,al,ab,ab,a
b
 950 DATA ba,ba,ba,bb,bc,bd,be,b
f
 955 DATA ba,ba,ba,bg,bh,bi,bj,b
k
 960 DATA bk,bj,bi,bh,bg,ba,ba,b
a
 965 DATA bf,be,bd,bc,bb,ba,ba,b
a
```

Illustration: Dorian Cross



NOW IN STOCK ON 16K CASSETTE:
FROGGER @ £22.95
CROSSFIRE @ £19.95
SHOOTING GALLERY @ £15.95
* PROTECTOR (32K Cassette/Disk)
Plus: on 32K DISK:
MOUSKATTACK @ £22.95
*THRESHOLD (40K) (unbelievable graphics!)
*RASTER BLASTER (real pinball!)
*ALI BABA & 40 THIEVES
* APPLE PANIC
*Call for Prices
Add 50p P&P
MORE ATARI SOFTWARE DUE SHORTLY ! !

AIRSTRIKE For The ATARI 400/800

● INTRODUCING THE NEW ARCADE GAME FOR ATARI COMPUTERS ! ● SUPERB SCROLLING GRAPHICS WITH DAZZLING COLOURS ! ● 100% MACHINE CODE PROGRAMME FOR ONE OR TWO PLAYERS ! ● MULTIPLE SKILL LEVELS – FIGHT YOUR WAY THROUGH CAVERNS AND TUNNELS WITH ATTACKING MISSILES FUEL AND AMMO DUMPS TO CONTEND WITH ! ● AVAILABLE NOW: 16K CASSETTE £15.95 } Plus 50p P & P
32K DISK £18.95 }

NEW TITLES FOR ATARI: Canyon Climber, Shooting Arcade, Pacific Coast Highway, Slime, Nautilus, Centipede, Mars Mission, Rearguard, Chicken, Alien Swarm, Track Attack, Clowns and Balloons and MUCH MUCH MORE! — CALL NOW FOR BEST PRICES.

NOW IN STOCK : ATARI TV GAMES PLUS ACTIVISION CARTRIDGES AT DISCOUNT PRICES ! WATCH OUT FOR PACMAN AND DEFENDER !

NATIONWIDE MAIL ORDER SERVICE ON ALL PRODUCTS – SEND STAMP OR CALL NOW FOR DETAILS

ACTION QUEST™

16K Assembly Language Real-Time Adventure Game For ATARI® 400/800 Computer

16K CASSETTE/DISK £19.95 Plus 50pp&p

Action Quest is a real time adventure game played with your joystick controller. You, represented as a ghost, move from room to room in an attempt to capture valuable prizes while eluding monsters and solving puzzles. Score is computed based both on prizes captured and elapsed time. Action Quest is entirely played as an action game, no keyboard input is required.

A complete game encompasses 30 rooms and 20 prizes, and prize capture is not always an easy task; a different technique or twist is involved in obtaining each one. Some require physical dexterity to reach while others can be acquired only through an intellectual problem solving path. Even some rooms are initially hidden from the player and must first be found before their prizes can be captured. Action Quest provides challenges both for fast action players as well as for those motivated by intrigue.

GEMINI ELECTRONICS

50 Newton St., Off Piccadilly, Manchester M1 2EA. Tel: 061-236 3083.

ATARI MICROCOMPUTERS

Pay it with Access / BARCLAYCARD VISA

✸ COMPUTER CHESS GAMES

Commodore VIC-20
PLUS GAMES NOW IN STOCK!

ATARI PERSONAL COMPUTER SYSTEMS ATARI
ATARI 400 & 800

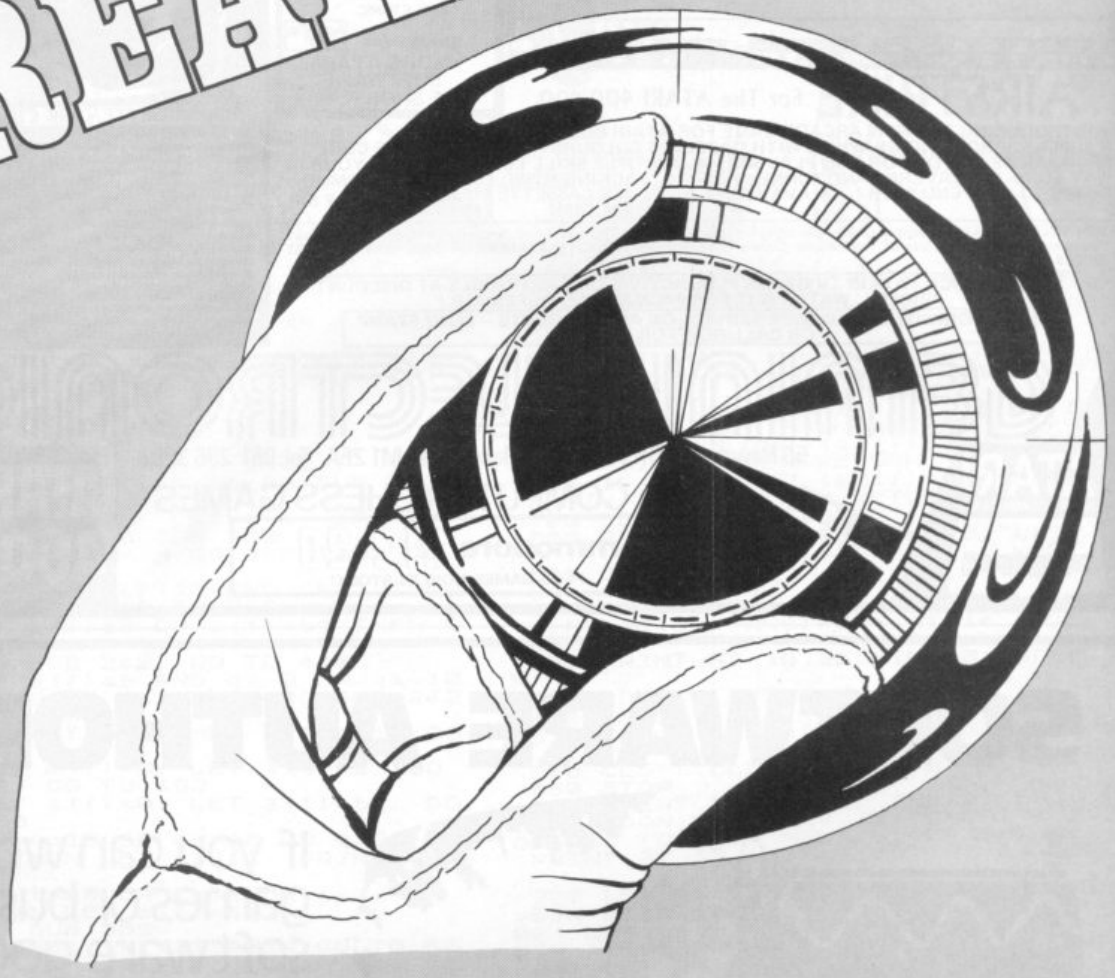
SOFTWARE AUTHORS

ENGLISH SOFTWARE company

If you can write games or business software good enough for Atari, Commodore and Apple users, then contact English Software Company, creators of "Airstrike".

50 Newton St., Piccadilly, Manchester, M1 2EA, Tel: 061-236-7259

CODE BREAKER II



Can you crack the hidden code? It can be set by the computer or by an opponent. The code is set by using numbers between 0 and 9. Clues to the code are shown at the end of each line as you attempt to crack it.

Once you have entered the numbers you wish to try press the space key. This will give you the clues. After entering the numbers and before checking the answer you can delete the line and start again by pressing the E key.

RUNS ON A

PET IN 8K

BY GRAHAM JONES

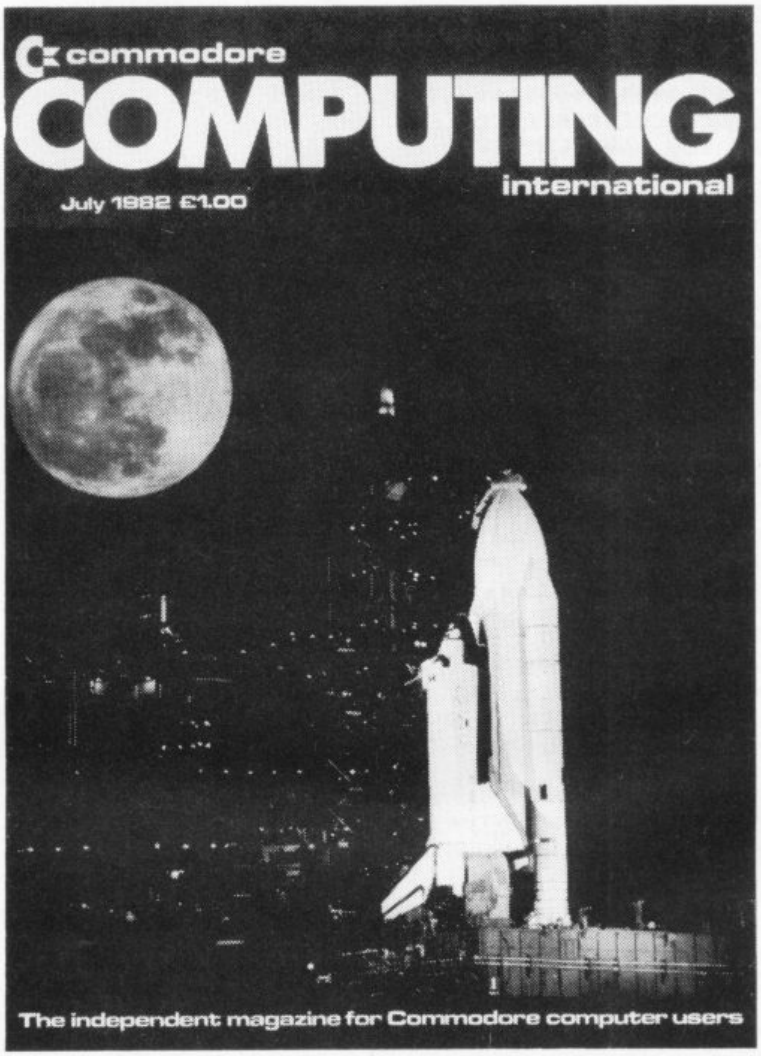
```
0 REM***CODEBREAKER 2 BY G.S.JONES***
1 PRINT"3":GOTO7
5 GETA$:IFA$=""THEN5
6 RETURN
7 FORI=1TO9:READM$(I):NEXT
8 DATA"A","B","C","D","E","F","G","H","I"
10 PRINTTAB(12)"                "
15 PRINTTAB(12)" codebreaker "
20 PRINTTAB(12)"                "
25 POKE59468,14:PRINT"tHE OBJECT OF THE GAME IS TO BREAK"
```

Illustration: Dorian Cross

```
30 PRINT"A HIDDEN CODE. tHIS CAN BE SET BY"
35 PRINT"AN OPPONENT IN THE 2 PLAYER GAME OR"
40 PRINT"BY THE pet IN THE ONE PLAYER GAME."
45 PRINT"tHE CODE IS SET BY THE USE OF THE"
50 PRINT"NUMBERS BETWEEN 0 AND 9 AND AT THE"
55 PRINT"END OF EACH LINE THE CLUES ARE SHOWN"
60 PRINT"E.G.":PRINT"hIDDEN CODE       aNSWER   cLUES"
65 PRINT"  2 3 3 5         2 3 4 3    2 1"
70 PRINT"  2 3 3 5         2 3 1 0    2 0"
75 PRINT"  2 3 3 5         2 3 3 6    3 0"
80 PRINT"  2 3 3 5         2 3 3 5    4 0"
85 PRINT"$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$":PRINT" PRESS ANY KEY TO CONTINUE "
95 PRINT"£££££££££££££££££££££££££££":GOSUB5
100 PRINT"3oNCE YOU HAVE ENTERED THE NUMBERS"
105 PRINT"YOU WISH TO TRY PRESS <space> THIS"
110 PRINT"WILL GIVE YOU THE ANSWER CLUES"
112 PRINT" aFTER ENTERING THE NUMBERS AND"
114 PRINT"BEFORE CHECKING THE ANSWER YOU"
116 PRINT"MAY DELETE THE LINE AND START"
118 PRINT"AGAIN BY PRESSING THE LETTER <e>"
120 PRINT"$$$$$$$$$$$$$$$$$$$$$$$$$$$$":PRINT" PRESS ANY KEY TO START "
124 PRINT"£££££££££££££££££££££££££":GOSUB5
126 REM**SET PLAYERS**
128 POKE59468,12:PRINT"3 ONE PLAYER OR TWO (1 OR 2)"
129 GOSUB5:IFVAL(A$)<1ORVAL(A$)>2THEN129
130 IFVAL(A$)=2THEN175
133 REM**ONE PLAYER SET**
135 PRINT"3 ONE PLAYER GAME":GOSUB2400
140 PRINT" THE PET WILL NOW SET A CODE"
150 FORJ=1TO1000:NEXT:P=1:FORN=1TOT:A(N)=INT(10*RND(1)):NEXT
160 GOSUB2000:GOTO1000
175 REM**TWO PLAYER SET**
180 H=1:X=2:B=0:Z=0:C=0:V=0
185 FORN=1TOT:A(N)=0:NEXT:P=2
190 PRINT"3 TWO PLAYER GAME":GOSUB2400
195 PRINT"HOW MANY ROUNDS (1 TO 8) ?";
200 GOSUB5:IFVAL(A$)<1ORVAL(A$)>8THEN200
205 U=VAL(A$):PRINTU:Z=U*2
210 PRINT"3PLAYER"H"SET CODE"
215 PRINTTAB(5):FORI=1TOT:PRINTM$(I)"    ";:NEXT:PRINT
225 PRINTTAB(4)"";:FORN=1TOT:GOSUB5:A(N)=VAL(A$)::PRINTA(N)" ";:NEXT
250 FORN=1TO1000:NEXT:GOSUB2000
1000 REM**PLAY GAME**
1005 L=0:LL=0
1010 IFP=2THENPRINT""TAB(19+T)"PLAYER"X
1012 PRINT"":IFLL>9THENPRINT""
1015 W=0:R=0
1020 PRINTTAB(Q);:FORN=1TOT:GOSUB5:E(N)=VAL(A$):PRINTE(N)"===}";:NEXT:GOSUB5
1025 IFA$<>"E"THEN1035
1030 PRINT:PRINTTAB(Q)"1";:FORI=1TOT:PRINT" ";:NEXTI:PRINT"1":GOTO1015
1035 GOSUB2500:PRINT""R"===}"W"===}"
1040 L=L+1:IFR=TTHEN1065
1045 IFL<10THEN1015
1050 LL=LL+L:GOSUB2300:GOSUB2000
1055 PRINT""TAB(Q);:FORN=1TOT:PRINTE(N)"===}";:NEXT:PRINT"}";
1060 PRINTR"===}"W"===}":L=1:GOTO1010
1065 PRINT""TAB(Q):FORI=1TOT:PRINTA(I)"===}";:NEXT:PRINT" CONGRATULATIONS"
1070 IFP=2THEN1085
1075 O=L+LL:FORN=1TO5000:NEXT
1080 PRINT"3YOU MADE"O"MOVES":GOTO2350
1085 IFH=2GOTO1095
1090 V=V+L+LL:H=2:X=1:GOTO1100
1095 C=C+L+LL:H=1:X=2
1100 FORN=1TO5000:NEXT:B=B+1:IFB<ZTHEN210
1105 PRINT"3"TAB(6)"PLAYER 1"TAB(26)"PLAYER 2"
1110 PRINTTAB(8)CTAB(29)V
1115 IFV>CTHENPRINT"PLAYER 1 IS THE WINNER"
```

Illustration: Dorian Cross

An exciting new Commodore peripheral



Own or use a Pet or a Vic?

Fed up with being ignored by all the traditional monthly magazines?

Fed up with listings, which are too simple or simply do not work?

You need *Commodore Computing,* the new monthly magazine. *Commodore Computing* is published by Nick Hampshire, author of *The Pet Revealed, Pet Graphics, A Library of Subroutines* and *The Vic Revealed.*

Each issue is packed with advanced advice on how to make the most of your computer, whether you use a Pet or a Vic.

Each issue covers a host of applications – software, hardware, machine code, games, business use – whatever it is you'll find it in *Commodore Computing.*

If you want to learn more about your computer, take out a subscription to *Commodore Computing.*

That's the only way to get it, and get it straight.

Send £12.50 for 1 year's subscription (10 issues) to:

Commodore Computing,
Magsub, Oakfield House, Perrymount Road, Haywards Heath, Sussex RH16 3DH

```
1120 IFV<CTHENPRINT"PLAYER 2 IS THE WINNER"
1125 IFV=CTHENPRINT"IT'S A DRAW"
1130 GOTO2350
2000 REM**DRAW BOARD**
2005 PRINT"3":PRINTTAB(Q)"O";:FORI=1TOT:PRINT"`2";:NEXT:PRINT"=."
2010 PRINTTAB(Q)"}";:FORI=1TOT:PRINT"?}";:NEXT:PRINT"=}"
2015 PRINTTAB(Q)"-";:FORI=1TOT:PRINT"`1";:NEXT:PRINT"==  / X"
2020 PRINTTAB(Q)"O";:FORI=1TOT:PRINT"`2";:NEXT:PRINT"=. O`2`."
2025 FORJ=1TO10:PRINTTAB(Q)"}";:FORI=1TOT:PRINT" }";:NEXTI:PRINT" } } }"
2030 PRINTTAB(Q)"+";:FORI=1TOT:PRINT"`{";:NEXTI:PRINT"=3 +`{`3":NEXTJ
2035 PRINTTAB(Q)"1-";:FORI=1TOT:PRINT"`1";:NEXT:PRINT"== -`1`="
2040 PRINT""TAB(23+T)"C=O=D=E=B=R=E=A=K=E=R":RETURN
2300 REM**QUESTION TIME**
2305 PRINT"3 DO YOU GIVE UP (Y OR N) ?":IFP=1GOTO2315
2310 PRINT"(IF YOU GIVE UP YOUR <TOTAL> SCORE IS    DOUBLED AS A PENALTY)"
2315 GOSUB5:IFA$="N"THENRETURN
2320 IFA$<>"Y"THEN2315
2325 PRINT"THE ANSWER IS:-"
2330 PRINTTAB(4);:FORI=1TOT:PRINTM$(I)"    ";:NEXT
2335 PRINT:PRINTTAB(3)"";:FORI=1TOT:PRINTA(I)" ";:NEXT:PRINT
2340 IFP=2GOTO1085
2350 PRINT"DO YOU WANT ANOTHER GAME (Y OR N)":GOSUB5:IFA$="Y"THEN128
2355 PRINT"THANKS FOR PLAYING":END
2400 PRINT"YOU CAN SET A CODE BETWEEN 3 AND 9"
2405 PRINT"NUMBERS IN LENGTH":PRINT"WHAT SIZE CODE DO YOU WISH TO TRY ?";
2410 GOSUB5:IFVAL(A$)<3ORVAL(A$)>9THEN2410
2415 T=VAL(A$):PRINTT:Q=(13-T):RETURN
2500 REM**COMPARITOR ROUTINE**
2505 FORK=1TOT:F(K)=0:G(K)=0:NEXT
2510 R=0:W=0:FORI=1TOT
2515 IFE(I)<>A(I)THEN2525
2520 F(I)=1:G(I)=1:R=R+1
2525 NEXTI:FORI=1TOT:IFG(I)=1GOTO2545
2530 FORJ=1TOT:IFA(I)<>E(J)ORF(J)=1GOTO2540
2535 F(J)=1:W=W+1:J=T
2540 NEXTJ
2545 NEXTI
2550 RETURN
READY.
```

Illustration: Dorian Cross

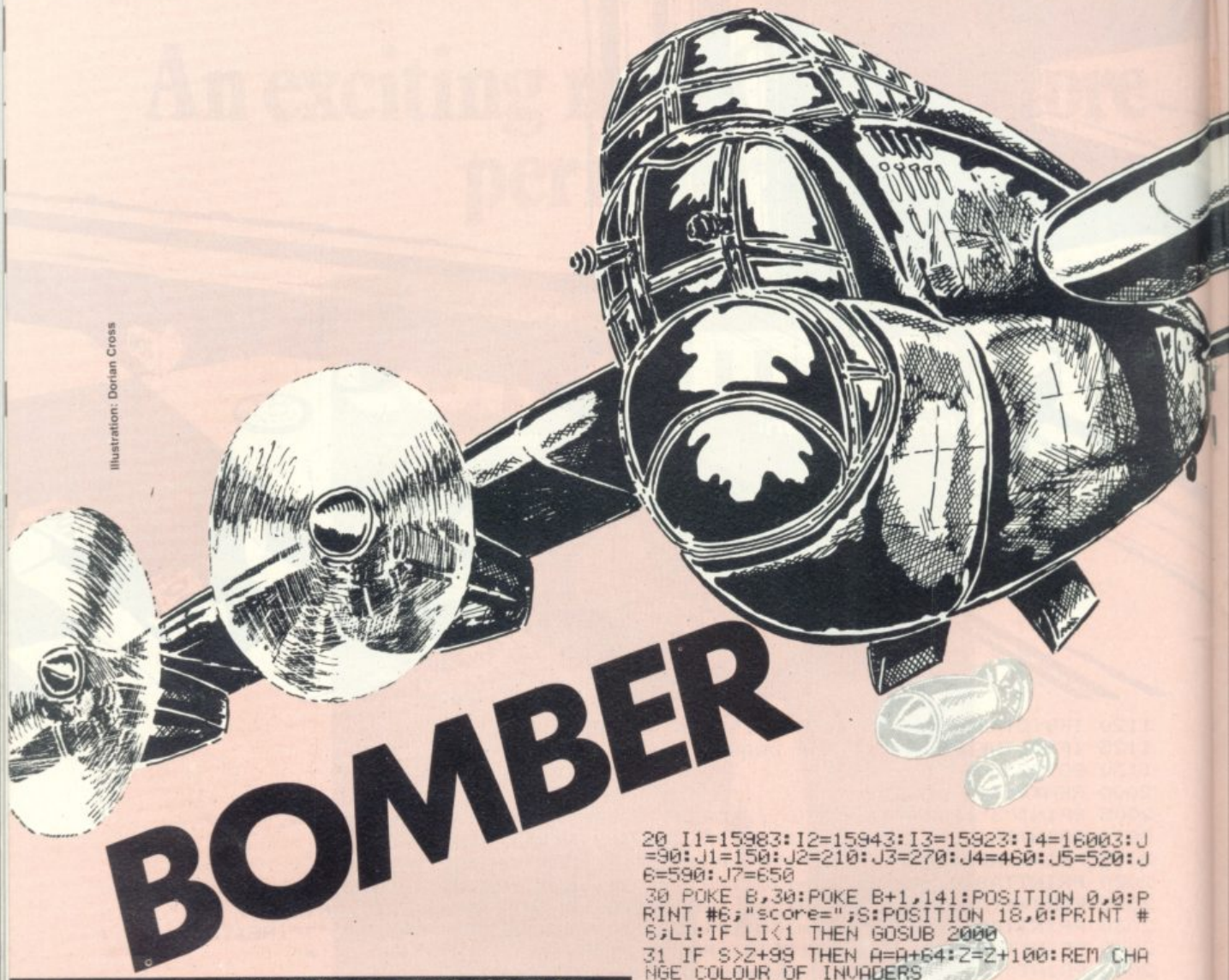


Illustration: Dorian Cross

BOMBER

RUNS ON AN ATARI 400 IN 6K

WITH JOYSTICKS

Beware the bouncing bombs! They'll get you given half a chance. And contact with one of these hopping horrors is decidedly lethal.

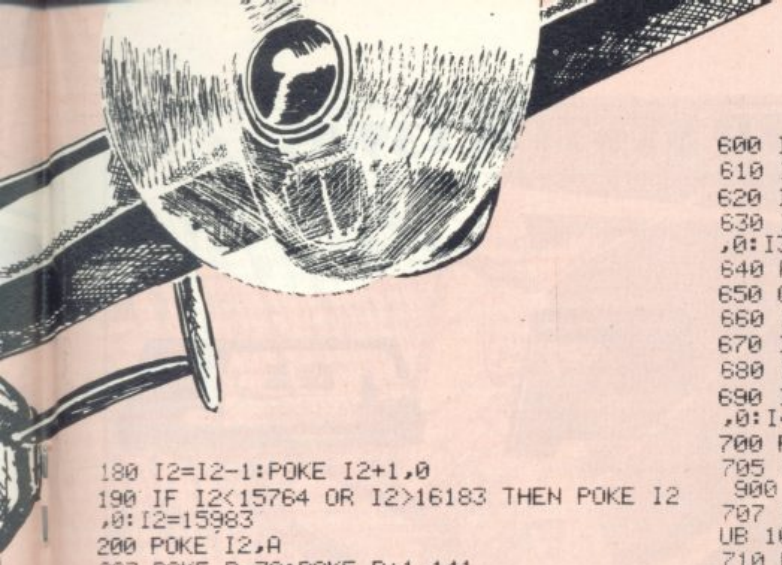
But you can protect yourself with a blast from your cannon which destroys the bobbing bombs.

Your cannon is situated on the right hand side of the Atari screen and the bombs bounce at you across the screen from the left. You control the firing base using a joystick.

So keep ducking and weaving — and stay alive!

BY JOHN BRIERLY

```
1 PRINT " ":POKE 752,1
2 SETCOLOR 2,0,0:POSITION 10,12:PRINT"TO
PLAY,PRESS 'START' "
3 IF PEEK(53279)=6 THEN 5
4 GOTO 3
5 A=202:LI=5:S=0
7 REM INITIALISE ALL VARIABLES
8 REM J,J1 etc. CHANGE WHEN AN INVADER I
S HIT AND CAUSE ITS RE-PLOTTING TO  BE B
YPASSED
10 GRAPHICS 1+16:B=15965
20 I1=15983:I2=15943:I3=15923:I4=16003:J
=90:J1=150:J2=210:J3=270:J4=460:J5=520:J
6=590:J7=650
30 POKE B,30:POKE B+1,141:POSITION 0,0:P
RINT #6;"score=";S:POSITION 18,0:PRINT #
6;LI:IF LI<1 THEN GOSUB 2000
31 IF S>Z+99 THEN A=A+64:Z=Z+100:REM CHA
NGE COLOUR OF INVADERS
32 IF A>202 THEN A=10
34 REM JOYSTICK CHECK
35 IF STRIG(0)=0 THEN 400
40 JS=STICK(0)
50 IF JS=14 THEN B=B-40:POKE B+40,0:POKE
 B+41,0
60 IF JS=13 THEN B=B+40:POKE B-40,0:POKE
 B-39,0
65 REM CHECK FOR BASE OUT OF RANGE OF SC
REEN
70 IF B<15745 THEN B=15745
80 IF B>16205 THEN B=16205
85 GOTO J
87 REM 1ST.INVADER
90 R=INT(RND(0)*20)
100 IF R<3 THEN I1=I1-20:POKE I1+20,0
110 IF R>=3 THEN I1=I1+20:POKE I1-20,0
120 I1=I1-1:POKE I1+1,0
125 REM CHECK FOR INVADER OUT OF RANGE A
ND RESET IF NEEDED (SAME FOR ALL THE INV
ADERS)
130 IF I1<15764 OR I1>16183 THEN POKE I1
,0:I1=15983
140 POKE I1,A
145 GOTO J1
147 REM 2ND.INVADER
150 I=INT(RND(0)*20)
160 IF I<17 THEN I2=I2-20:POKE I2+20,0
170 IF I>=17 THEN I2=I2+20:POKE I2-20,0
```

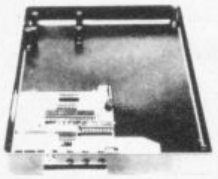


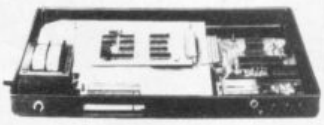
```
180 I2=I2-1:POKE I2+1,0
190 IF I2<15764 OR I2>16183 THEN POKE I2
,0:I2=15983
200 POKE I2,A
203 POKE B,30:POKE B+1,141
205 GOTO J2
207 REM 3RD.INVADER
210 G=INT(RND(0)*20)
220 IF G<3 THEN I3=I3-20:POKE I3+20,0
230 IF G>=3 THEN I3=I3+20:POKE I3-20,0
240 I3=I3-1:POKE I3+1,0
250 IF I3<15764 OR I3>16183 THEN POKE I3
,0:I3=15983
260 POKE I3,A
265 GOTO J3
267 REM 4TH.INVADER
270 Q=INT(RND(0)*20)
280 IF Q<17 THEN I4=I4-20:POKE I4+20,0
290 IF Q>=17 THEN I4=I4+20:POKE I4-20,0
300 I4=I4-1:POKE I4+1,0
310 IF I4<15764 OR I4>16183 THEN POKE I4
,0:I4=15983
320 POKE I4,A
325 REM CHECK FOR COLLISION BETWEEN INVA
DERS AND BASE
330 IF PEEK(B)=A OR PEEK(B+1)=A THEN GOS
UB 1000
380 GOTO 30
390 REM FIRING SECTION(BASICALLY 1ST. HA
LF REPEATED)
400 FOR T=B+2 TO B+17:POKE T,71:POKE T-1
,0:SOUND 0,10,8,4
410 JS=STICK(0)
420 IF JS=14 THEN B=B-40:POKE B+40,0:POK
E B+41,0
430 IF JS=13 THEN B=B+40:POKE B-40,0:POK
E B-39,0
440 IF B<15745 THEN B=15745
450 IF B>16205 THEN B=16205
455 GOTO J4
460 R=INT(RND(0)*20)
470 IF R<17 THEN I1=I1-20:POKE I1+20,0
480 IF R>=17 THEN I1=I1+20:POKE I1-20,0
490 I1=I1-1:POKE I1+1,0
500 IF I1<15764 OR I1>16183 THEN POKE I1
,0:I1=15983
510 POKE I1,A
515 GOTO J5
520 I=INT(RND(0)*20)
530 IF I<3 THEN I2=I2-20:POKE I2+20,0
540 IF I>=3 THEN I2=I2+20:POKE I2-20,0
550 I2=I2-1:POKE I2+1,0
560 IF I2<15764 OR I2>16183 THEN POKE I2
,0:I2=15983
570 POKE I2,A
575 POKE B,30:POKE B+1,141
580 GOTO J6
590 G=INT(RND(0)*20)
600 IF G<17 THEN I3=I3-20:POKE I3+20,0
610 IF G>=17 THEN I3=I3+20:POKE I3-20,0
620 I3=I3-1:POKE I3+1,0
630 IF I3<15764 OR I3>16183 THEN POKE I3
,0:I3=15983
640 POKE I3,A
650 Q=INT(RND(0)*20)
660 IF Q<3 THEN I4=I4-20:POKE I4+20,0
670 IF Q>=3 THEN I4=I4+20:POKE I4-20,0
680 I4=I4-1:POKE I4+1,0
690 IF I4<15764 OR I4>16183 THEN POKE I4
,0:I4=15983
700 POKE I4,A
705 IF T=I1 OR T=I2 OR T=I3 OR T=I4 THEN
 900
707 IF PEEK(B)=A OR PEEK(B+1)=A THEN GOS
UB 1000
710 POKE T,0:SOUND 0,0,0,0:NEXT T
720 REM CYCLE AROUND
800 GOTO 30
850 REM HIT INVADER SUBROUTINE
900 FOR Y=1 TO 50:SOUND 0,Y,12,10:SOUND
1,Y,10,10:POKE T-1,158:POKE T,29:POKE T+
1,156:NEXT Y:POKE T-1,0:POKE T+1,0
910 POKE I1,0:POKE I2,0:POKE I3,0:POKE I
4,0:I1=15983:I2=15943:I3=15923:I4=16003
915 REM SCORE INCREMENTED:JC=JUMP CHECK
920 S=S+10:JC=JC+1:IF JC=1 THEN J=145:J4
=515
925 IF JC=2 THEN J1=203:J5=575
930 IF JC=3 THEN J2=265:J6=650
935 REM IF 4TH.INVADER HAS BEEN HIT,  GO
TO 'NEW SET SUBROUTINE'
940 IF JC=4 THEN GOSUB 3000
945 REM CYCLE AROUND----------
950 SOUND 0,0,0,0:SOUND 1,0,0,0:GOTO 30
960 REM SUBROUTINE FOR A BASE HIT
1000 FOR Y=80 TO 1 STEP -1:SOUND 0,Y,12,
10:SOUND 1,Y,10,10
1005 POKE B,94:POKE B+1,75:POKE B+2,195:
POKE B+3,75:POKE B+4,92
1010 SOUND 0,Y,12,10:SOUND 1,Y,12,10:NEX
T Y
1015 POKE I1,0:POKE I2,0:POKE I3,0:POKE
I4,0:POKE B+2,0:POKE B+3,0:POKE B+4,0
1020 SOUND 0,0,0,0:SOUND 1,0,0,0
1025 REM LOSE 1 LIFE BUT GAIN 5 POINTS
1030 LI=LI-1:S=S+5:I1=15983:I2=15943:I3=
15923:I4=16003
1050 RETURN
1060 REM 'GAME OVER SUBROUTINE'
2000 GRAPHICS 2:SETCOLOR 2,0,0:FOR H=1 T
O 100:SOUND 0,H,8,10:SOUND 1,H,12,10
2010 POSITION 5,4:PRINT #6;"game over!":
POSITION 1,6:PRINT #6;"YOUR SCORE WAS ";
S
2020 NEXT H
2030 PRINT "PRESS 'START' TO PLAY AGAIN"
2035 SOUND 0,0,0,0:SOUND 1,0,0,0
2037 REM CHECK FOR PRESSING 'START':7=NO
THING PRESSED:6='START':5='SELECT':3='OP
TION'
2040 IF PEEK(53279)=6 THEN 5
2050 GOTO 2040
3000 FOR K=1 TO 5
3010 FOR N=80 TO 7 STEP -2:SOUND 0,N,12,
10:SOUND 1,N,8,10:NEXT N
3020 FOR L=1 TO 30:NEXT L
3040 NEXT K
3050 JC=0:J=90:J1=150:J2=210:J3=270:J4=4
60:J5=520:J6=590
3060 RETURN
```

FULLER FD SYSTEM £39.95

Professional Keyboard & Case for Sinclair ZX81 & ZX Spectrum

KEYBOARD LAYOUT:
All the Sinclair ZX81 keys are duplicated on our layout, with extra shift and new line keys. The professional momentary action key switches have a guaranteed life of 10 operations. The unit is fully built tested and comes complete with a money back guarantee.





The ZX81 fits inside
The tough ABS injection moulded plastic case measures 8" x 14" x 2½" and hooks up to your ZX printed circuit board in minutes. No technical know how or soldering is required.

INSTALLATION
Simply unscrew the ZX printed circuit board from its case and screw it into the FD Case.

MOTHERBOARD:
We also manufacture a mother board which allows expansion to the ZX memory and I/O facilities WITHIN the case, as well as our power supply unit and reset switch.

AD Code: vg

	Price †	Qty	Amount
Fuller FD System 42 Keyboard & case	39.95		
FD System Motherboard	15.95		
FD 16K Memory Module	29.95		
FD 64K Memory Module	78.95		
FD PSU 9 Volts at 2 amp	12.95		
FD *Shipping and Handling*	2.50		

The ZX16K Memory Module will fix inside the case, using the new Adaptor Board at £9.75 or the Motherboard.
By removing the ZX PSU from its case this can also be fixed inside. We will carry out the installation work free of charge if required.

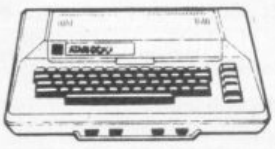
Mail to **FULLER MICRO SYSTEMS,**
The ZX Centre, Sweeting Street, Liverpool 2. England, U.K.
SAE for more details — Enquiries: Tel. 051-236 6109

Name .....
Address .....
City/State/Zip .....

Keyboard Only Available!
Built £24.95
Kit £18.95 (+ P.P. 80p)

ATARI

NEW



NEW LOW PRICES

400 (exc BASIC)	**£173.04**
400 (inc BASIC)	**£216.52**
800 (exc BASIC)	**£390.43**
800 (inc BASIC)	**£433.91**

ATARI PACKAGE DEALS

400 (16k) + BASIC + Recorder + Joystick + 5 Blank Cassettes + Free Programs	**£251.30**
400 (32k) + All above items	**£307.83**
800 (48k) + All above items	**£546.96**
800 (48k) + Disk Drive + Joystick + 3 Blank Disks + Demo Disks + 3 Apx Programs	**£734.78**

SHARP

MZ80K	**£327**	**VIC 20**	**£152**
MZ80A	**£434**	**GENIE 1 & 2**	**£289**
MZ80B	**£950**	**ATOM**	from **£150**

+ PERIPHERALS + SOFTWARE + BOOKS + MAGAZINES + CHESS COMPUTERS + GAMES FOR ZX81 and APPLE

DRAGON 32
32K + COLOUR + HIGH RES. GRAPHICS + SOUND + TYPEWRITER KEYBOARD + SLOTS FOR JOYSTICKS + CARTRIDGES EXPANDABLE TO 64K
ALL FOR ***£173.00*** + VAT

NEW ATARI SOFTWARE
Tumblebugs, Canyon Climber, Shooting Arcade, Pacific Coast Highway, Clowns and Balloons, Protector, Chicken, Slime, Apple Panic, Track Attack — ALL AT **£17.35**
Micropainter £19.56
Dodge Racer £15.60

+ ATARI, INTELLIVISION & HANIMEX TV GAMES + CARTRIDGES BY IMAGIC & ACTIVISION

GAMER
24 GLOUCESTER ROAD
Tel: 698424
BRIGHTON

PLEASE ADD 15% VAT TO ALL PRICES

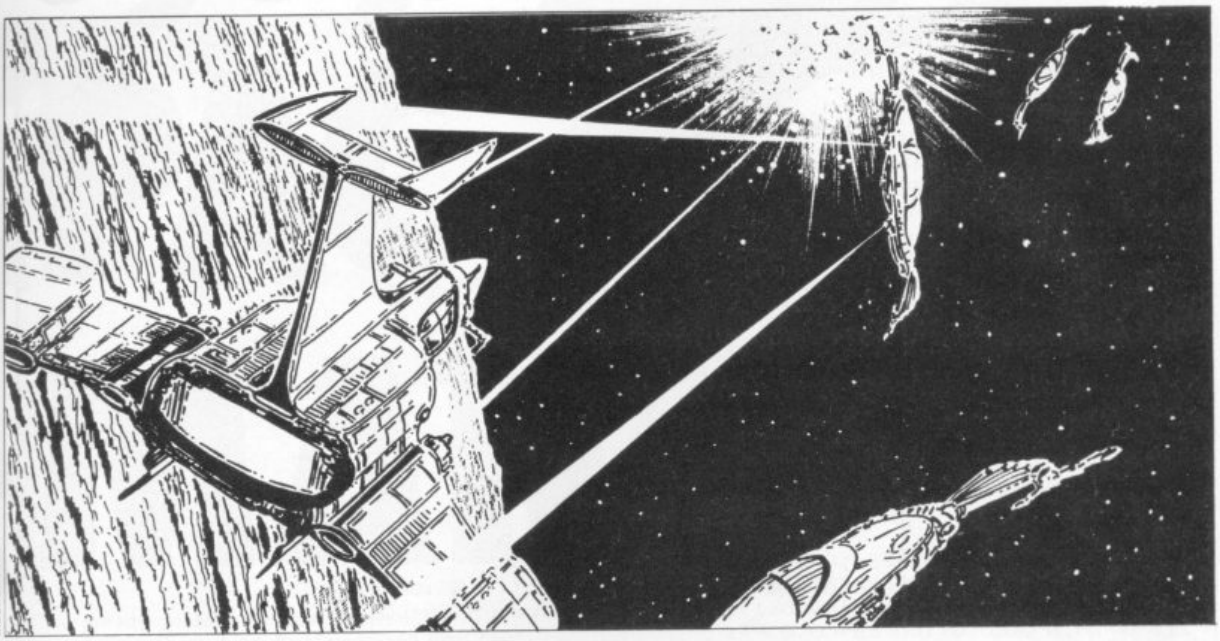


Illustration: Dorian Cross

MINI DEFENDER

RUNS ON A ZX81 IN 1K BY SIMON WEBB

Let some arcade aliens run riot around your ZX81 and program in this special 1K version of a top video game.

The program is started, either automatically on LOADing, or by using, GOTO 60. Your score will appear at the top of the screen. This is updated after every wave.

At the bottom of the screen a display will tell you which wave you are passing through; the enemy ships attack in a total of eight waves.

Variables are: X: The height of the ship, controlled by the "7" key. Y: The height of the enemy ship, randomly chosen. S: The current score, depending on how many enemy ships you hit, and which wave you are in. A: This defines which part of the strings, A$ and B$ are printed. C: This has a fixed value of 1. D: This has a fixed value of 0. F: This has a fixed value of 6. C$: This is simply a blank space, used for wiping out your ship, and for comparisons.

```
  10 PRINT AT X,C;"          "
  20 IF X<>Y THEN RETURN
  30 LET S=S+(10-E)*(B$(E)<>C$)
  40 SGN B$(E)=C$
  50 RETURN
  60 LET S=D
  70 FOR E=9 TO 2 STEP -C0 ?INKE
Y$  PRINT AT D,D;"SCORE ";AT
 D,F+C;S;AT F+C,D;"WAVE ";CHR$
 (155-E);"  "
  90 FOR B=C TO 20
 100 DIM B$(18)
 110 LET B$(E)=CHR$ (E+14)
 120 LET Y=INT (RND*5)+C
 130 FOR A=C TO C+E
 140 PRINT AT Y,C;B$(A TO A+8);A
T X,D;C$;AT F,D;A$(A TO A+9)
 150 LET X=X+(INKEY$="" AND X<5)
-(INKEY$="7" AND X>C)
 160 PRINT AT X,D;">"
 170 IF INKEY$="0" THEN GOSUB 10
 180 NEXT A
 190 IF X=Y AND B$(E)<>C$ THEN G
OTO 220
 200 PEEK B
 210 NEXT E
 220 PRINT AT D,F;S
 999 STOP
1000 SAVE "DEF"
1010 GOTO 60
```

At the left of the screen you will see your ship. This will automatically move down and can be moved up by pressing the "7" key.

The enemy ships will appear from the right of the screen, and will start from a point closer to you each time a new wave is started.

When you are vertically aligned with the enemy ship, press "0" to fire. The ship will then disappear, and your score will be incremented.

If an enemy ship hits you, your score will be displayed, and the program will stop with a report of 9/999. To restart use GOTO 60.

The maximum possible score is 720.

Lines 10 to 50 are the fire subroutine. If your ship is not vertically aligned with the enemy, then the program RETURN's to the main loop (20), otherwise your score is calculated (30), and the enemy ship is blanked (40).

The start of the program (60), sets the score to zero, and starts the variable, E, which determines which "wave" you go through (70).

Line 80 prints the top and bottom borders, along with your current score.

The variable, Y, which is the height at which the enemy appears is set up in line 120.

Line 150 controls the height of your ship (the variable X), and line 160 prints your ship at this position.

Line 220 prints your final score, and then stops at 999.

Lines 1000 and 1010 are a save routine, which ensures that the program starts at line 60 and is not RUN. The program must be started in this way, because several variables are entered directly, to conserve memory.

To start the program use GOTO 60 not RUN.

IMPORTANT: Before the program will run correctly you will have to key in these lines directly. LET C = 1. LET D = 0. LET F = 6. LET X = 3. LET C$ = "one space". LET A$ = (graphics of) "QW863684Q6QW863684Q".

```
10 PRINT"■":POKE36879,27:REM TITLE AND CREDITS
20 PRINT"■■■■■■■■■■■■■■MINI-PACK■■■■"
30 PRINT"■■■■■■■■■■■■FOR"
40 PRINT"■■■■■■■■■■■■THE"
50 PRINT"■■■■■■■■■■■■VIC20"
60 PRINT"■■■■■■■■BY DAVID MACK"
70 PRINT"■■■■■■■FARNBOROUGH"
80 FORI=1TO2000:NEXTI
85 S1=1:S2=-1:S3=22:S4=-22:RS=160:GH=102:PM=87:D1=46:G1=94
90 TL=200:K1=56:K2=57:K3=58:K4=59:D2=90:CD=30720
100 INPUT"■■■INSTRUCTIONS(Y/N)";A$
110 IFA$="Y"THENGOSUB2000
115 T=0:S=0:P=8064:GOSUB1000
120 G=7680+INT(RND(1)*424)+40:POKE36878,15:DN=36876
125 IFPEEK(G)<>D1THENG=G-1:T=T+1:IFT>5THENG=7734:GOTO125
130 TI$="000000":POKEG,G1:POKEG+CD,0
140 D=INT(RND(1)*4)+1
150 M=PEEK(197)
160 IFD=4THENC=S1
170 IFD=2THENC=S2
180 IFD=3THENC=S3
190 IFD=1THENC=S4
200 IFPEEK(G+C)=RSORPEEK(G+C)=GHTHEN140
205 IFPEEK(G+C)=PMTHENPRINT"S■THE GHOST GOT YOU!!  ■":GOTO2500
210 POKEG,D1:POKEG+CD,4:IFRND(1)<.05THENPOKEG,D2:POKEG+CD,2
215 G=G+C:POKEG,G1:POKEG+CD,0:F=1
220 IFF=1THEN235
230 GOTO200
235 GOTO300
236 IFRND(1)<.25THEN140
240 IFVAL(TI$)>TLTHENPRINT"S■TIME UP                ■":GOTO3000
250 GOTO200
300 REM YOUR MOVE+SCORE
310 POKEP,PM:POKEP+CD,5
320 M=PEEK(197)
330 IFM=K1THENX=S2
335 IFM=K2THENX=S1
340 IFM=K3THENX=S4
345 IFM=K4THENX=S3
350 IFPEEK(P+X)=RSORPEEK(P+X)=GHTHEN380
355 IFPEEK(P+X)=D1THENS=S+10:Z=1
356 IFPEEK(P+X)=94THENPRINT"S■THE GHOST GOT YOU!!  ■":GOTO2500
360 IFPEEK(P+X)=D2THENS=S+100:Z=1
365 POKEP,32:P=P+X
370 POKEP,PM:POKEP+CD,5:F=0
375 IFZ=1THEN POKEDN,220:FORI=1TO8:NEXTI:POKEDN,0:Z=0
380 PRINT"■■■■■■■■■■■■■■
```

PAC MAN

That greedy gobbler Pacman is getting everywhere these days. So if you can't beat him — well you know what comes next! Computer and Video Games has discovered this version of the arcade favourite for all you VIC-20 owners out there in microcomputer-land.

In this version a randomly moving ghost leaves a trail of dots — and sometimes diamonds — in its wake. Your Pac-Man chases it around a maze munching the dots — worth 10 points — and the diamonds — worth 100 points.

The player gets two minutes to eat as much as he can. To move the Pac-Man use keys 2 for left, 4 for right, 6 for up and 8 for down.

The Pac-Man appears at a different point within the maze at the start of each game and there is a high score facility. The author of Pacman, David Mack, says the record so far is 6520 in the two minutes allowed. Can you beat that?

RUNS ON A VIC-20 IN 3.5K

BY DAVID MACK

```
2020 PRINT"DIAMONDS TO SCORE AS"
2030 PRINT"MANY POINTS AS YOU CAN"
2040 PRINT"■IN TWO MINUTES."
2060 PRINT"■WATCH OUT-THE GHOST"
2070 PRINT"WILL EAT YOU AND THE"
2080 PRINT"DIAMONDS."
2090 PRINT"■MOVEMENT:-"
2100 PRINT"2-LEFT    4-RIGHT"
2110 PRINT"6-UP      8-DOWN"
2120 PRINT"■GOOD LUCK"
2130 PRINT"■PRESS A KEY"
2140 GETA$:IFA$=""THEN2140
2150 RETURN
2500 N=36875
2510 FORI=255TO128STEP-1
2520 POKEN,I
2525 FORZ=1TO5:NEXTZ
2530 NEXTI
2535 POKEN,0
3000 FORI=1TO500:NEXTI:PRINT"■■"
3010 IFS>HSTHENHS=S
3015 PRINT"YOUR SCORE WAS"S
3020 IFS=HSTHENPRINT"■A NEW HI-SCORE":POKE198,0:INPUT"■WHAT IS YOUR NAME■■■■■■";A$
3030 PRINT"■HI-SCORE="HS
3035 PRINT"■BY "A$
3040 POKE198,0:INPUT"■ANOTHER GAME(Y/N)";B$
3050 IFB$="Y"THEN 115
3055 PRINT"■GOOD BYE.HOPE YOU"
3056 PRINT"■ENJOYED PLAYING."
3060 END
```

Illustration: Jon Davis

SPECTRUM BOOKS

Available from booksellers

Games to Play on your ZX Spectrum Martin Wren-Hilton
£2.50 *ISBN 0 906812 28 3*

Computer Puzzles: For Spectrum and ZX81 Ian Stewart & Robin Jones
£2.50 *ISBN 0 906812 27 5*

Easy Programming for the ZX Spectrum Ian Stewart & Robin Jones
£5.95 *ISBN 0 906812 23 2*

Further Programming for the ZX Spectrum Ian Stewart & Robin Jones
£7.50 (approx) *ISBN 0 906812 24 0*

Spectrum in Education Eric Deeson
£6.50 (approx) *ISBN 0 906812 29 1*

Published by: Shiva Publishing Limited
4 Church Lane, Nantwich, Cheshire CW5 5RQ
Telephone: (0270) 628272

SHIVA

ARCADE QUALITY SOFTWARE FROM LLAMASOFT!!

Spectrum

ATARI 400/800 16K

GRAPHICS/CHARACTER CREATOR

Now you can define your very own custom character sets. Or edit the existing sets. Results fully displayed on screen in modes 0, 1 and 2. Many exciting features including: Save, Screen Modes, Reflect, Invert etc.
Supplied on cassette with data £8.00

SPECTRUM

Full details of our range of Spectrum software available on request free of charge. Arcade games and utilities. SAE for details.

FREE!! TO VIC, ATARI AND SPECTRUM OWNERS. SEND S.A.E. NOW FOR FREE PROGRAM AND catalogue of software.

Send Cash/Cheque/P.O. with order to:
LLAMASOFT SOFTWARE,
Dept, CVG, Lindon House, The Green, Tadley, Basingstoke, Hants. Tel: (07356) 5038

WANTED!
GOOD QUALITY SOFTWARE. SEND DEMO FOR QUICK REPLY.

TRADE ENQUIRIES WELCOME
PLEASE ADD 50P P&P

ATARI

VIC-20 by Jeff Minter

VIC-20

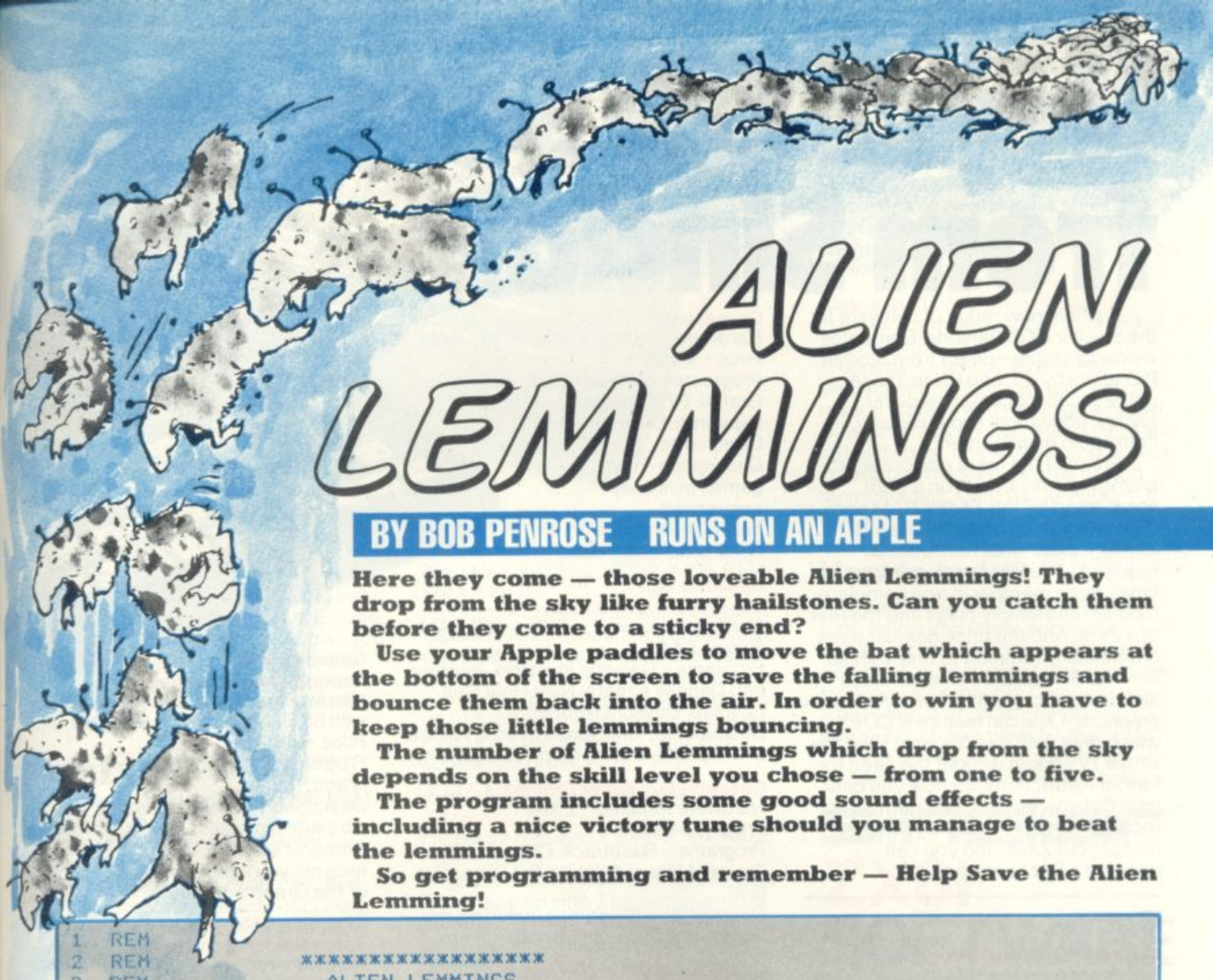
DEFENDA! m/c
Full feature version of the popular arcade game including; Swarmers, Baiters, Pods, Landers and Humanoids. Controls: Up, Down, Thrust, Reverse, Fire and Smart Bomb. High resolution colour graphics. Joystick controls. 8k or 16k expansion needed. Only £10.00

TRAXX! m/c
Vic 20 version of the brand new arcade game "Amidar" A Packman/Quix crossbreed. All machine code, fast and fun. Joystick controls. Hi-res colour graphics. 8k or 16k expansion needed. Only £10.00

RATMAN! m/c
Kill the squeaking rats which fall from the sky before they dig in and prey on you! Game includes rats, hammers, men, mutants and spears. M/c, hi-res colour graphics. 8k or 16k expansion needed. Fast and fun for only £8.95

BLITZKRIEG (3.5k) (Bomb B.A.)
Fly your Vulcan bomber over enemy territory and destroy the city. 25 levels of play. Hi-res colour graphics on the unexpanded Vic 20. Only £4.95

UTILITY PROGRAMS (for unexpanded Vic 20)
GAME GRAPHICS EDITOR. Create your very own custom characters. Full features include Reflect, Save on Tape etc.
SOFTKEY 24.24 key words inc. Peek, Poke, List, Save on your function keys.
Both programs supplied on one cassette.
Only £6.00



ALIEN LEMMINGS

BY BOB PENROSE RUNS ON AN APPLE

Here they come — those loveable Alien Lemmings! They drop from the sky like furry hailstones. Can you catch them before they come to a sticky end?

Use your Apple paddles to move the bat which appears at the bottom of the screen to save the falling lemmings and bounce them back into the air. In order to win you have to keep those little lemmings bouncing.

The number of Alien Lemmings which drop from the sky depends on the skill level you chose — from one to five.

The program includes some good sound effects — including a nice victory tune should you manage to beat the lemmings.

So get programming and remember — Help Save the Alien Lemming!

```
1  REM
2  REM              ********************
3  REM                ALIEN LEMMINGS
4  REM                BY BOB PENROSE
5  REM                   FEB 1982
6  REM              ********************
7  REM
10  TEXT : HOME : CLEAR
20  GOSUB 1000: GOSUB 1500: GOSUB 1090
24  REM
25  REM              **********************
26  REM              CHECK CORRECT PADDLE
27  REM              **********************
28  REM
30  VTAB 23: HTAB 1: CALL  - 868: PRINT "PRESS PADDLE BUTTON TO BEGIN"
40 X =  PEEK ( - 16287): IF X > 127 THEN  VTAB 23: CALL  - 868: GOSUB 1600
    : GOTO 100
50 X =  PEEK ( - 16286): IF X > 127 THEN  VTAB 23: HTAB 1: CALL  - 868: INVERSE
    : PRINT "PLEASE USE OTHER PADDLE": NORMAL : FOR I = 1 TO 2000: NEXT :
     GOTO 30
54  REM
55  REM    ==="(P)ADDLE" CONTAINS 3 CTRL-G===
56  REM
60  GOTO 40
94  REM
95  REM              **********************
96  REM              MAIN LOOP OF PROGRAM
97  REM              **********************
98  REM
100  FOR I = 0 TO 8 STEP ST%
110  IF CH%(I) = 1 THEN 140
120  IF  RND (1) > R THEN CH%(I) = 1:X%(I) = 20 * (I + 2):Y%(I) = 70: GOTO
    150
130  GOTO 280
140  XDRAW 2 AT X%(I),YY%(I):Y%(I) = Y%(I) + V%(I)
```

Illustration: Jon Davis

New ZX81 Software from Sinclair.

A whole new range of software for the Sinclair ZX81 Personal Computer is now available – direct from Sinclair. Produced by ICL and Psion, these really excellent cassettes cover games, education, and business/household management.

Some of the more elaborate programs can only be run on a ZX81 augmented by the ZX 16K RAM pack. (The description of each cassette makes it clear what hardware is required.) The RAM pack provides 16-times more memory in one complete module, and simply plugs into the rear of a ZX81. And the price has just been dramatically reduced to only £29.95.

The Sinclair ZX Printer offer full alphanumerics and highly-sophisticated graphics. A special feature is COPY which prints out exactly what is on the whole TV screen without the need for further instructions. So now you can print out your results for a permanent record. The ZX Printer plugs into the rear of your ZX81, and you can connect a RAM pack as well.

Games

Cassette G1: Super Programs 1 (ICL)
Hardware required – ZX81.
Price – £4.95.
Programs – Invasion from Jupiter. Skittles. Magic Square. Doodle. Kim. Liquid Capacity.
Description – Five games programs plus easy conversion between pints/gallons and litres.

Cassette G2: Super Programs 2 (ICL)
Hardware required – ZX81.
Price – £4.95.
Programs – Rings around Saturn. Secret Code. Mindboggling. Silhouette. Memory Test. Metric conversion.
Description – Five games plus easy conversion between inches/feet/yards and centimetres/metres.

Cassette G3: Super Programs 3 (ICL)
Hardware required – ZX81.
Price – £4.95.
Programs – Train Race. Challenge. Secret Message. Mind that Meteor. Character Doodle. Currency Conversion.
Description – Fives games plus currency conversion at will – for example, dollars to pounds.

Cassette G4: Super Programs 4 (ICL)
Hardware required – ZX81.
Price – £4.95.
Programs – Down Under. Submarines. Doodling with Graphics. The Invisible Invader. Reaction. Petrol.
Description – Five games plus easy conversion between miles per gallon and European fuel consumption figures.

Cassette G5: Super Programs 5 (ICL)
Hardware required – ZX81 + 16K RAM.
Price – £4.95.
Programs – Martian Knock Out. Graffiti. Find the Mate. Labyrinth. Drop a Brick. Continental.
Description – Five games plus easy conversion between English and continental dress sizes.

Cassette G6: Super Programs 6 (ICL)
Hardware required – ZX81 + 16K RAM.
Price – £4.95.
Programs – Galactic Invasion, Journey into Danger. Create. Nine Hole Golf. Solitaire. Daylight Robbery.
Description – Six games making full use of the ZX81's moving graphics capability.

Cassette G7: Super Programs 7 (ICL)
Hardware required – ZX81.
Price: – £4.95.
Programs – Racetrack. Chase. NIM. Tower of Hanoi. Docking the Spaceship. Golf.
Description – Six games including the fascinating Tower of Hanoi problem.

Cassette G8: Super Programs 8 (ICL)
Hardware required – ZX81 + 16K RAM.
Price – £4.95.
Programs – Star Trail (plus blank tape on side 2).
Description – Can you, as Captain Church of the UK spaceship Endeavour, rid the galaxy of the Klingon menace?

Cassette G9: Biorhythms (ICL)
Hardware required – ZX81 + 16K RAM.
Price – £6.95.
Programs – What are Biorhythms? Your Biohythms.
Description – When will you be at your peak (and trough) physically, emotionally, and intellectually?

Cassette G10: Backgammon (Psion)
Hardware required – ZX81 + 16K RAM.
Price – £5.95.
Programs – Backgammon. Dice.
Description – A great program, using fast and efficient machine code, with graphics board, rolling dice, and doubling dice. The dice program can be used for any dice game.

Cassette G11: Chess (Psion)
Hardware required – ZX81 + 16K RAM.
Price – £6.95.
Programs – Chess. Chess Clock.
Description – Fast, efficient machine code, a graphic display of the board and pieces, plus six levels of ability, combine to make this one of the best chess programs available. The Chess Clock program can be used at any time.

Cassette G12: Fantasy Games (Psion)
Hardware required – ZX81 (or ZX80 with 8K BASIC ROM) + 16K RAM.
Price – £4.75.
Programs – Perilous Swamp. Sorcerer's Island.
Description – Perilous Swamp: rescue a beautiful princess from the evil wizard. Sorcerer's Island: you're marooned. To escape, you'll probably need the help of the Grand Sorcerer.

Cassette G13: Space Raiders and Bomber (Psion)
Hardware required – ZX81 + 16K RAM.
Price – £3.95.
Programs – Space Raiders. Bomber.
Description – Space Raiders is the ZX81 version of the popular pub game. Bomber: destroy a city before you hit a sky-scraper.

Cassette G14: Flight Simulation (Psion)
Hardware required – ZX81 + 16K RAM.
Price – £5.95.
Program – Flight Simulation (plus blank tape on side 2).
Description – Simulates a highly manoeuvrable light aircraft with full controls, instrumentation, a view through the cockpit window, and navigational aids. Happy landings!

Education

Cassette E1: Fun to Learn series – English Literature 1 (ICL)
Hardware required – ZX81 + 16K RAM.
Price – £6.95.
Programs – Novelists. Authors.
Description – Who wrote 'Robinson Crusoe'? Which novelist do you associate with Father Brown?

Cassette E2: Fun to Learn series – English Literature 2 (ICL)
Hardware required – ZX81 + 16K RAM.
Price – £6.95.
Programs – Poets, Playwrights. Modern Authors.
Description – Who wrote 'Song of the Shirt'? Which playwright also played cricket for England?

Cassette E3: Fun to Learn series – Geography 1 (ICL)
Hardware required – ZX81 + 16K RAM.
Price – £6.95.
Programs – Towns in England and Wales. Countries and Capitals of Europe.
Description – The computer shows you a map and a list of towns. You locate the towns correctly. Or the computer challenges you to name a pinpointed location.

Cassette E4: Fun to Learn series – History 1 (ICL)
Hardware required – ZX81 + 16K RAM.
Price – £6.95.
Programs – Events in British History. British Monarchs.
Description – From 1066 to 1981, find out when important events occurred. Recognise monarchs in an identity parade.

Cassette E5: Fun to Learn series – Mathematics 1 (ICL)
Hardware required – ZX81 + 16K RAM.
Price – £6.95.
Programs – Addition/Subtraction. Multiplication/Division.
Description – Questions and answers on basic mathematics at different levels of difficulty.

Cassette E6: Fun to Learn series – Music 1 (ICL)
Hardware required – ZX81 + 16K RAM.
Price – £6.95.
Programs – Composers. Musicians.
Description – Which instrument does James Galway play? Who composed 'Peter Grimes'?

Cassette E7: Fun to Learn series – Inventions 1 (ICL)
Hardware required – ZX81 + 16K RAM.
Price – £6.95.
Programs – Inventions before 1850. Inventions since 1850.
Description – Who invented television? What was the 'dangerous Lucifer'?

Cassette E8: Fun to Learn series – Spelling 1 (ICL)
Hardware required – ZX81 + 16K RAM.
Price – £6.95.
Programs – Series A1-A15. Series B1-B15.
Description – Listen to the word spoken on your tape recorder, then spell it out on your ZX81. 300 words in total suitable for 6-11 year olds.

Business/household

Cassette B1: The Collector's Pack (ICL)
Hardware required – ZX81 + 16K RAM.
Price – £9.95.
Program – Collector's Pack, plus blank tape or side 2 for program/data storage.
Description – This comprehensive program should allow collectors (of stamps, coins etc.) to hold up to 400 records of up to 6 different items on one cassette. Keep your records up to date and sorted into order.

Cassette B2: The Club Record Controller (ICL)
Hardware required – ZX81 + 16K RAM.
Price – £9.95.
Program – Club Record Controller plus blank tape on side 2 for program/data storage.
Description – Enables clubs to hold records of up to 100 members on one cassette. Allows for names, addresses, 'phone numbers plus five lots of additional information – eg type of membership.

Cassette B3: VU-CALC (Psion)
Hardware required – ZX81 + 16K RAM.
Price – £7.95.
Program – VU-CALC.
Description – Turns your ZX81 into an immensely powerful analysis chart. VU-CALC constructs, generates and calculates large tables for applications such as financial analysis, budget sheets, and projections. Complete with full instructions.

Cassette B4: VU-FILE (Psion)
Hardware required – ZX81 + 16K RAM.
Price – £7.95.
Programs – VU-FILE. Examples.
Description – A general-purpose information storage and retrieval program with emphasis on user-friendliness and visual display. Use it to catalogue your collection, maintain records or club memberships, keep track of your accounts, or as a telephone directory.

How to order

Simply use the FREEPOST order form below and either enclose a cheque or give us your credit card number. Credit card holders can order by phone – simply call Camberley (0276) 66104 or 21282 during office hours. Either way, please allow up to 28 days for delivery, and there's a 14-day money-back option, of course.

sinclair
ZX81 SOFTWARE

Sinclair Research Ltd,
Stanhope Road, Camberley, Surrey, GU15 3PS.
Tel: Camberley (0276) 66104 & 21282.

To: Sinclair Research, FREEPOST, Camberley, Surrey, GU15 3BR.
Please send me the items I have indicated below.

Qty	Cassette	Code	Item price	Total
	G1: Super Programs 1	30	£4.95	
	G2: Super Programs 2	31	£4.95	
	G3: Super Programs 3	32	£4.95	
	G4: Super Programs 4	33	£4.95	
	G5: Super Programs 5	34	£4.95	
	G6: Super Programs 6	35	£4.95	
	G7: Super Programs 7	36	£4.95	
	G8: Super Programs 8	37	£4.95	
	G9: Biorhythms	38	£6.95	
	G10: Backgammon	39	£5.95	
	G11: Chess	40	£6.95	
	G12: Fantasy Games	41	£4.75	
	G13: Space Raiders & Bomber	42	£3.95	
	G14: Flight Simulation	43	£5.95	
	E1: English Literature 1	44	£6.95	

Qty	Cassette	Code	Item price	Total
	E2: English Literature 2	45	£6.95	
	E3: Geography 1	46	£6.95	
	E4: History 1	47	£6.95	
	E5: Mathematics 1	48	£6.95	
	E6: Music 1	49	£6.95	
	E7: Inventions 1	50	£6.95	
	E8: Spelling 1	51	£6.95	
	B1: Collector's Pack	52	£9.95	
	B2: Club Record Controller	53	£9.95	
	B3: VU-CALC	54	£7.95	
	B4: VU-FILE	55	£7.95	
	ZX 16K RAM pack	18	£29.95	
	ZX Printer	27	£59.95	
	Post & packing – *only* if ordering hardware		£2.95	

TOTAL £ ____

I enclose a cheque/postal order to Sinclair Research Ltd for £ ____

Please charge my *Access/Barclaycard/Trustcard no.
*Please delete as applicable.

Mr/Mrs/Miss

Address

NSA 21

```
150  DRAW 2 AT X%(I),Y%(I):YY%(I) = Y%(I): POKE PIT,PP%: POKE DUR,20: CALL
     NOISE: IF V%(I) =  - 3 AND Y%(I) < HT% + ( INT (30 *  RND (1))) THEN
     V%(I) = 3
170 I% =  PDL (0)
180  IF I% < 15 THEN I% = 15
190  IF I% > 240 THEN I% = 240
200  DRAW 1 AT I%,K%:II% = I%
220  IF CH%(I) = 0 THEN 270
230  IF Y%(I) <  > 148 THEN 240
235 CH%(I) = 0: XDRAW 2 AT X%(I),YY%(I): POKE PIT,250: POKE DUR,150: CALL
     NOISE:PT% =  - 20:DF% = 1: GOSUB 2000
240  IF Y%(I) <  > 142 THEN 270
245  IF ((I% > X%(I) - 15) AND (I% < X%(I) + 6)) THEN V%(I) =  - 3: POKE P
     IT,120: POKE DUR,100: CALL NOISE:PT% = 10:DF% = 0: GOSUB 2000
270  XDRAW 1 AT II%,K%
275 PP% =  INT ( RND (1) * 2) * 200
280  NEXT
290  GOTO 100
994  REM
995  REM      **********************************
996  REM      INPUT DATA AND MACHINE CODE
997  REM       SUBROUTINE FOR SOUND AND SHAPES
998  REM      **********************************
999  REM
1000 K% = 143:SC% = 0:S% = 5:A% = 5:R% = 0:C1% = 3:C2% = 5
1010  FOR I = 0 TO 8:V%(I) = 3:CH%(I) = 0: NEXT
1020 NOISE = 786:PIT = 789:DUR = 787
1030  FOR I = 768 TO 799: READ J: POKE I,J: NEXT
1035  REM     ======================
1036  REM     DATA FOR SHAPES TABLE
1037  REM     ======================
1040  DATA    2,0,6,0,11,0,45,53,63,39,0
1050  DATA    60,44,44,46,190,60,0
1055  REM
1056  REM   DATA FOR SOUND ROUTINE
1057  REM
1060  DATA    160,255,162,160,202,208,253,173,48,192,136,208,245,96
1065  REM
1066  REM   SET STARTING ADDRESS FOR MACHINE CODE SUBROUTINE
1067  REM
1070  POKE 232,0: POKE 233,3
1080  RETURN
1084  REM
1085  REM   ================
1086  REM   SET UP BASE LINE
1087  REM   ================
1088  REM
1090  HGR : HCOLOR= C2%: SCALE= S%: ROT= R%
1100  FOR I = 279 TO 0 STEP  - 1: HPLOT I,150: POKE PIT,I * .5: POKE DUR,1
     0: CALL NOISE: NEXT
1110  FOR I = 0 TO 279
1120  HPLOT I,151
1130  POKE PIT,I * .5: POKE DUR,10: CALL NOISE
1150  NEXT
1160  HCOLOR= C1%: RETURN
1494  REM
1495  REM          ***************
1496  REM           TITLE ROUTINE
1497  REM          ***************
1498  REM
1500  HOME : VTAB 3: HTAB 10
1501  FOR I = 1 TO 16: PRINT "*";: POKE PIT,100: POKE DUR,100: CALL NOISE:
      NEXT
1502 A$ = "*ALIEN LEMMINGS*": VTAB 4: HTAB 10
1503  FOR I = 1 TO  LEN (A$): PRINT  MID$ (A$,I,1);: POKE PIT, ASC ( MID$
     (A$,I,1)): POKE DUR, ASC ( MID$ (A$,I,1)) / 30: CALL NOISE: NEXT
1504  VTAB 5: HTAB 10
1505  FOR I = 1 TO 16: PRINT "*";: POKE PIT,100: POKE DUR,100: CALL NOISE:
      NEXT
1506  PRINT : PRINT : HTAB 10: PRINT "BY BOB PENROSE - FEB 1982"
1510  VTAB 12: HTAB 1: CALL  - 958: PRINT "LEVEL (1-5) ";
1520  GET Q$: IF Q$ <  CHR$ (49) OR Q$ >  CHR$ (53) THEN  PRINT  CHR$ (7);
```

Illustration: Jon Davis

```
    : GOTO 1520
1530  PRINT Q$;:L% =  VAL (Q$)
1535  GET Q$: IF Q$ =  CHR$ (8) THEN 1510
1537  IF Q$ <  >  CHR$ (13) THEN 1535
1540  ON L% GOTO 1550,1560,1570,1580,1590
1543  REM
1544  REM   **************************
1545  REM   SET UP STEP SIZE FOR LOOP
1546  REM   PROBABILITY,HEIGHT AND
1547  REM   HIGH SCORE FOR EACH LEVEL
1548  REM   **************************
1549  REM
1550 ST% = 4:R = .95:HT% = 80:HS% = 500: RETURN
1560 ST% = 4:R = .9:HT% = 100:HS% = 300: RETURN
1570 ST% = 2:R = .95:HT% = 80:HS% = 250: RETURN
1580 ST% = 2:R = .9:HT% = 100:HS% = 200: RETURN
1590 ST% = 1:R = .95:HT% = 80:HS% = 150: RETURN
1594  REM
1595  REM       ******************
1596  REM       SCOREBOARD ROUTINE
1597  REM       ******************
1598  REM
1600  HOME
1610  VTAB 21: HTAB 1: INVERSE : PRINT "LEVEL";: NORMAL : PRINT " ";: INVERSE
    : PRINT "*";: NORMAL : PRINT L%;: INVERSE : PRINT "*"
1620  VTAB 21: HTAB 24: PRINT "**********"
1630  VTAB 22: HTAB 13: PRINT "***";: HTAB 24: PRINT "*SCORE";: HTAB 35: PRINT
    "*"
1640  VTAB 23: PRINT "ALIENS LEFT";: HTAB 13: PRINT "*";: NORMAL : PRINT A
    %;: INVERSE : PRINT "*";: HTAB 24: PRINT "**********"
1650  VTAB 24: HTAB 13: PRINT "***";: NORMAL
1660  VTAB 22: HTAB 34: PRINT SC%: RETURN
1990  REM
1991  REM   ************************
1992  REM   CHECKS AND PRINTS SCORE
1993  REM   ************************
1994  REM
2000 SC% = SC% + PT%
2010  IF SC% < 0 THEN SC% = 0
2015  VTAB 22: HTAB 31: PRINT "    ": REM  -4 SPACES-
2020  VTAB 22: HTAB (34 - (SC% > 9) - (SC% > 99) - (SC% > 999)): PRINT SC%

2030 A% = A% - DF%: VTAB 23: HTAB 14: PRINT A%
2040  IF A% = 0 THEN  POP : GOTO 2500: REM  -YOU LOSE!-
2050  IF SC% = HS% THEN  POP : GOTO 3000: REM  -YOU WIN!-
2060  RETURN
2490  REM
2491  REM    **********
2492  REM     END OF GAME
2493  REM    **********
2494  REM
2500  TEXT : HOME
2505  VTAB 21: HTAB 1: CALL  - 958
2510  PRINT "YOUR SCORE IS ";SC%;" ON LEVEL ";L%
2520  PRINT : PRINT "PLAY AGAIN (Y/N)? ";
2530  GET Q$: PRINT Q$: IF Q$ = "Y" THEN  RUN
2540  IF Q$ <  > "N" THEN  PRINT  CHR$ (7);: GOTO 2530
2550  TEXT : HOME : PRINT "THANKS FOR PLAYING": END
2990  REM
2991  REM     ***************
2992  REM      VICTORY SALUTE
2993  REM     ***************
2994  REM
3000  TEXT : HOME
3010  FOR I = 50 TO 1 STEP  - 1
3020  POKE PIT,5 * I: POKE DUR,5 * I: CALL NOISE
3030  NEXT
3040  VTAB 10: HTAB 10
3045  FLASH : PRINT "========="
3050  HTAB 10: PRINT " YOU WIN "
3055  HTAB 10: PRINT "=========": NORMAL
3060  GOTO 2505
```

PRACTICAL PROGRAMMING

THE IMPORTANCE OF GOOD COMMUNICATION

Communication and interaction between the program and the user is a particularly important subject. In most cases all the user will see is what appears on the screen, and the program will be judged by how helpful the instructions are and how easy they are to follow.

Instructions should always be included in the program, even if you are going to be the only person using it. It is surprisingly easy to forget how to operate a program when you have not seen it for six months. Where the instructions are long and complicated full instructions may have to be provided separately, as text accompanying a listing in a magazine or as a printed sheet or booklet accompanying a program sold on tape. However, even when a complete set of printed instructions is available the program should still include some instructions and helpful prompts.

It is useful to include a HELP function in your programs, and this can be done quite easily if the instructions are contained in a subroutine. For example:

Illustration: Jon Davis

```
1000 CLS
1010 PRINT "THE OBJECT OF
  THE GAME IS . . ."
1020 PRINT . . .
  . . . . . .
1100 PRINT . . .
1110 PRINT "PRESS ANY KEY
  TO CONTINUE"
1120 GET A$
1130 IF A$=" " THEN GOTO 1120
1140 RETURN.
```

The program can begin with the usual:

```
10 PRINT "DO YOU WANT
  INSTRUCTIONS? (Y OR N)"
20 GET A$
30 IF A$="Y" THEN GOTO 60
40 IF A$="N" THEN GOTO 70
50 GOTO 20
60 GOSUB 1000: REM PRINT
  INSTRUCTIONS
70 . . .
```

The HELP function can then be implemented by testing for the user typing "H" or "HELP" whenever an input is being processed. For example:

```
100 GET A$
110 IF A$="H" THEN GOSUB 1000
120 IF A$="L" THEN GOSUB 2000
130 . . .
```

This allows the user to see the instructions again at any time. Of course, you must remember that printing the instructions will destroy the display, and you may have to add extra instructions to restore the display afterwards.

Another point to remember when the instructions are long and need to be printed in two or more blocks is to allow the user to go back and re-read earlier blocks.

If the instructions can be divided into sections each of which applies in only one part of the program it is best to arrange HELP so that it gives only the instructions that refer to the part of the program currently being executed.

The amount of detail you need to give in the instructions depends on how well-known the game is and how complicated the instructions are.

For example, in a chess program you only need give instructions on how to enter moves into the computer and how to use any extra features like recording a game, as anyone wanting to use a chess program will already know how to play the game.

Even in a simple and well-known game you may sometimes want to include full instructions; for example, although you may think that no-one needs to be told how to play Noughts and Crosses it would be advisable to include full details if the program is likely to be used by young children.

With lesser-known games you will need to provide full details of how to play the game, even if the game is described in easily available standard books.

There are many people who will type in a long program if the instructions are complete and the description makes the game look interesting but will not bother if they have to go to the trouble of getting a book before they can play the game.

DESIGNING THE SCREEN LAYOUT

Screen layout is another feature that should be designed carefully to make things easy for the user. Although the type and amount of information you need to display depends on the program there are some general principles that should be kept in mind.

The current state of the game should be displayed prominently and the screen should not be cluttered with subsidiary information that is not of immediate use.

The best format is usually to have the main action in the central part of the screen and put any numerical or textual information at the top or bottom.

With action games of the space invaders or asteroids type the main problem is producing the moving graphics. The only other information needed is the player's current score and the best score to date, and perhaps the number of laser bases or spaceships the player has left.

In this type of game the scores, etc., are not essential to the player but should be displayed so he can see how he is doing. But there are games like Moon Lander where height, speed, etc. are essential.

BY TED BALL

In this case the essential information should be displayed clearly and fairly close together on the screen. The player should not have to keep shifting his attention from one part of the screen to another to find the required information, when he needs to concentrate on what should be done.

ADVENTURE AND INFORMATION . . .

At the other extreme we have the Adventure type game where there is a large amount of textual information and there is not room on the screen for all the current data on the state of the game.

In such cases it is necessary to separate the information into a number of blocks and allow each block to be called up to the screen whenever it is wanted.

Adventure was originally designed for large mainframe computers where the usual input/output device was a hard copy terminal or a VDU that simulated a hard copy terminal.

Because of this, the information was displayed as text which scrolled up, and on a VDU the old information was lost whenever new information was printed.

The earliest Adventure games on home microcomputers followed this practice, but with a memory-mapped screen it is possible to do better.

The information provided in an Adventure program generally falls into one of two types: permanent or semi-permanent information like the description of current surroundings or the inventory of the player's equipment, and transitory information like the result of performing an action.

The more recent Adventure-type games designed specifically for microcomputers take advantage of the memory-mapped screen by dividing the display into two sections for the two types of information.

This makes it possible to leave, for example, the inventory on the screen while the player is typing in a number of commands trying to get something to happen.

DEALING WITH STRATEGY GAMES

In strategy games the amount of information you need to display can vary, according to the game, from a simple graphical picture of the current position and a note of whose turn it is, up to complex graphics, several different scores, and a record of all the moves to date.

The main point to watch with this kind of game is that the screen does not get filled with irrelevant or out of date information, and also that the player can easily see the latest move and the effect it has on the state of the game.

In most cases you only need to provide simple messages, "MY TURN", "YOUR TURN", "I WIN", etc, but it is often useful to provide a little more. For example, in Noughts and Crosses it is more helpful if the prompt says something like "YOUR TURN: PLEASE TYPE IN ROW NUMBER, COLUMN NUMBER".

You should also try to make the program's responses as fast as possible, as people will soon get bored if they regularly have to wait while the program is working out its move.

If an occasional slow response is unavoidable it is best to indicate this to the player with a message, like "I'M THINKING. PLEASE WAIT A MOMENT". This will also tell the player that the machine is still working, and he will not get worried about the computer having crashed when nothing happens for a few seconds or tens of seconds.

The best way to improve the appearance and usability of your programs is to look at them, and at other people's programs, critically, and note the good and bad features.

If you think about what you like and dislike in the programs you use you will be better prepared to include the former and exclude the latter next time you program.

IF THE CLOUDHOPPERS, WASPS, SPIDERS, METEORS, OR SATELLITES DON'T BEAT YOU...

...RENAISSANCE WILL

CLOUDBURST
meteor run
Renaissance
SPIDERS of MARS
satellites and meteorites

5 More great VIC Cartridge games from Audiogenic

Available from all VIC dealers or direct from Audiogenic Ltd. PO Box 88, Reading, Berks. (0734 586334) Credit cards accepted. Meteor Run, Renaissance, Spiders of Mars, Satellites and Meteorites £24.99, Cloudburst: £19.99 (inclusive of VAT and p&p). All titles copyright UMI INC represented in Europe by Audiogenic. Send for full catalogue.

GO GO GO

Having shown an approach to programming the rules of Go in previous articles, this one is devoted to those impatient souls who ask "Yes, BUT how do you get it to play?" Getting a computer to play Go well is a very ambitious project. We shall limit ourselves in this article to the simplest possible solution to getting a program to play at all!

The problem is best attacked by examining the result that each player must achieve. Figure 1 shows the end of a game — a rather artificial game for the sake of clarity. The stones marked ▽ show the territorial boundaries. The players score one point for each vacant intersection in their territory. If they could have avoided it — it's easy with hindsight! — they wouldn't have played the unmarked stones at all, because each reduces their potential score by a point.

The game is clearly over because not only can neither player benefit by playing in their own areas but playing inside their opponent's areas which are so well established would be suicidal.

Now take a couple of moves back — see figure 2. The only sensible moves possible are at the intersections indicated by a cross. Why? Because these places define the boundary between opposing armies. Or more concretely — each is next to both a white and a black stone. In this context, "next" means any of upto eight intersections — less at the edge of the board — surrounding the intersection in question.

Figure 3 shows the same game earlier on. The intersections next to both black and white stones are marked with a cross. These provide a subset of the moves either player might make. The other moves depend on a perception of where the territories will form. Easy for a human! Very difficult for a computer program! So let us restrict our computer to playing on those clearly detectable boundary intersections.

Progress indeed! But what happens at the beginning of the game. Unfortunately on an empty board there are no intersections next to both black and white stones — nor will there be for several moves to come!

One way to overcome this hurdle is to select a set of default points so that if the program cannot find a boundary intersection it can use a default point instead.

Figure 4 shows a good pattern for a 9x9 board. There are enough default points so that detectable boundaries are certain to occur, and incidentally, these are good strategic points to play on anyhow.

However, it is important to delete a default point once a stone is played next to it. As the game gets underway, the territorial boundaires must become paramount.

One problem remains. Which of the several options at each move should the program choose? The simplest answer is that it does not matter — any solution will do. For instance, if the Basic you use can generate random numbers, why not use this facility to pick one of the options in an unpredictable fashion?

The standard of play of the program leaves a lot to be desired but:

- It can form territories
- It will not invade opponent's areas when it is silly to do so
- Less obviously, it does capture opponent stones that do not manage to surround territory
- And it knows when to stop!

The next article will examine some of the ways of improving this very basic but effective method of computer play.

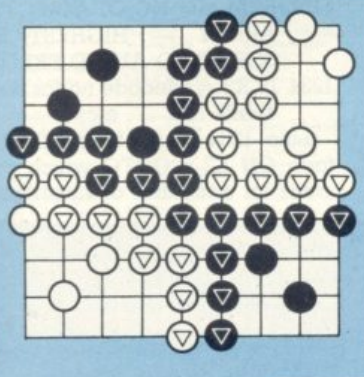


Fig 1.

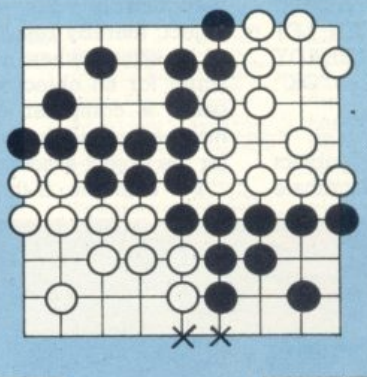


Fig 2.

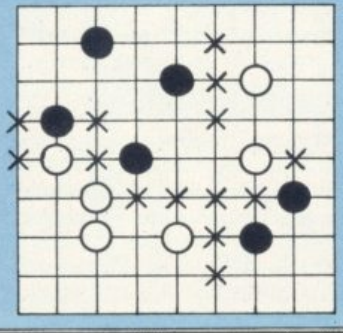


Fig 3.

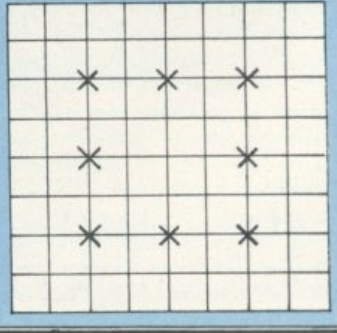


Fig 4.

Adventure

WATER, WATER, EVERYWHERE!

Filling a bucket with water sounds a simple act but can lead to nasty complications in an Adventure program.

Water is a substance that can make programming a real headache, since it doesn't obey the simple rules that most objects follow. To take any you must be carrying a suitable container.

The second complication is that having filled your container, there is still nearly as much water left as before! How can we cope with that?

If water is treated as an object in the object array, then when taken it will disappear from its original location. So a way round this is to use a flag, and to include the presence of water in the location description.

Let's refresh our memories about our existing TAKE routine:

```
1100 IF P(K2) ◇ LN THEN 3010
     ELSE LET P(K2)=50: LET IN =
     IN+1
```

We can interrupt this line by inserting:

```
1100 IF R3$ = "WATER" THEN
     1234 ELSE IF P(K2) ..... etc.
1234 IF LN ◇ 14 THEN LET Q1$ =
     "I DON'T SEE ANY HERE"
     ELSE IF P(12) ◇ 50 THEN LET
     Q1$ = "NO CONTAINER"
     ELSE IF C(12)=3 THEN LET
     Q1$ = "BUCKET'S ALREADY
     FULL" ELSE LET Q1$ = "OK":
     LET C(12) = 3
1235 GOTO 100
```

In the above the bucket is object no. 12 and its flag C(12) will indicate whether it is full or empty — 3 if full, else 2. 50, you may remember, is the notional location number we assigned to any object in the player's inventory.

Water, of course, will have to be a recognisable noun rather than an object, thereby resulting in a value of K2 which when used as a subscript for an object variable could cause a computer error, since it may be beyond the dimension limits for the object-associated arrays.

For example, if there are 20 objects and 30 nouns in the game, the noun WATER may return a value of 25 for K2. Thus the original line 1100 will bomb, as will our modified version, if another noun is TAKEN.

The solution is to first scan the object array for a recognisable object. If not found, scan the noun string. If a valid noun is found, add to its found position in the string the highest dimension of the object array.

The noun string is now effectively an extension of the object array, the resulting value of K2 being unique for object or noun.

We can now once again modify line 1100:

```
1100 IF K2 > n THEN 1234 ELSE IF
     P(K2) . . .
1101 REM n = NO OF OBJECTS IN
     ARRAY — HIGHEST SUB-
     SCRIPT TO AVOID ERROR.
1234 IF K2 = (decode no for water)
     THEN LET . . . etc.
```

Line 1234 could have taken the form ON K2-n GOTO which could cater for a number of situations.

For Western fans there's real atmosphere in Ghost Town, another Scott Adams game. This is pure Adventure with excitement and mystery at every turn.

Walking up the deserted street you will really feel as if you are there, and quite chilling that feeling is when you discover you are the only person there. Who then, is ringing that bell?

Try buying a lunchtime drink in the saloon and you'll be out of luck, but what gives after nightfall?

There are many different problems to solve. How do you break IN to a jail? How do you ride a horse? Can you find one? Scott's punctuation doesn't make it easy! How do you blow up a safe? Why does your Stetson feel so uncomfortable? And where oh where are those last two treasures hidden?

All these, and answers to many other spine chilling mysteries will gradually be revealed as you play Ghost Town — one of my personal favourites among Adventures!

Ghost Town runs on Atari, Apple, Sorceror, TRS-80 and Video Genie machines.

TIME SEARCH FOR ANOTHER DOCTOR WHO

I have been venturing into the past and future in The Time Machine, the latest in the Mysterious Adventures series from Molimerx, the Bexhill based TRS-80 software specialists.

The plot is quite original. You, the player, are a journalist seeking to interview Doctor Potter, the inventor of a Time Machine.

Sounds fairly straightforward, but unfortunately Doctor Potter has mysteriously disappeared. Another snag is that the Time Machine has developed a fault, and is rather unreliable.

You have to mend the machine and then find Doctor Potter. In your quest you will visit many strange places, as diverse as Troy, a black monolith, and the ghost galleon Marie Celeste.

Time Machine is presented with a split screen, with location details at the top and conversation scrolling beneath this. Lower case will be displayed if your machine has this feature. The enjoyment of the game is considerably enhanced by the use of a couple of quite clever visual effects, which I will leave you to discover.

I sat down with my family, and we just managed to complete the game in one long evening sitting — but there were five of us and we are all hardened Adventurers! So this would possibly make an ideal first for someone not wanting to solve the seemingly impossible.

Time Machine runs on a 16K TRS-80 Model I and III, and Video Genie. Molimerx have announced that the series is now to be published in the United States. Good luck to them and to author Brian Howarth!

BY KEITH CAMPBELL

100 FREE PROGRAMS
FROM SILICA SHOP — WITH EVERY PURCHASE OF AN
ATARI 400 800

ATARI

ATARI PRICES REDUCED!
We at Silica Shop are pleased to announce some fantastic reductions in the prices of the Atari 400/800 personal computers. We believe that the Atari at its new price will become the U.K.'s most popular personal computer and have therefore set up the Silica Atari Users Club. This club already has a library of over 500 programs and with your purchase of a 400 or 800 computer we will give you the first 100 free of charge. There are also over 350 professionally written games and utility programs, some are listed below. Complete the reply coupon and we'll send you full details. Alternatively give us a ring on 01-301 1111 or 01-309 1111.

ATARI 400 with 16K £199

ATARI 400 with 32K £248

ATARI 800 with 16K £449

400/800 SOFTWARE & PERIPHERALS

Don't buy a T.V. game! Buy an Atari 400 personal computer and a game cartridge and that's all you'll need. Later on you can buy the Basic Programming cartridge (£35) and try your hand at programming using the easy to learn BASIC language. Or if you are interested in business applications, you can buy the Atari 800 + Disk Drive + Printer together with a selection of business packages.

Silica Shop have put together a full catalogue and price list giving details of all the peripherals as well as the extensive range of software that is now available for the Atari 400/800. The Atari is now one of the best supported personal computers. Send NOW for Silica Shop's catalogue and price list as well as details on our users club.

THE FOLLOWING IS JUST A SMALL SELECTION FROM THE RANGE OF ITEMS AVAILABLE:

ACCESSORIES
Cables
Cassettes
Diskettes
Joysticks
Le Stick - Joystick
Misc Supplies
Paddles

ADVENTURE INT
Scott Adams Adv
No 1 Adventureland
No 2 Pirate Adv
No 3 Mission Imp
No 4 Voodoo Cast
No 5 The Count
No 6 Strange Ody
No 7 Mystery Fun
No 8 Pyramid of D
No 9 Ghost Town
No 10 Sav Island 1
No 11 Sav Island 2
No 12 Golden Voy
Angle Worms
Deflections
Galactic Empire
Galactic Trader
Lunar Lander
Mountain Shoot
Rearguard
Star Flite
Sunday Golf

AUTOMATED SIMULATIONS
Crush Crumble Cmp
Datestones of Ryn
Dragons Eye
Invasion Orion
Rescue at Rigel
Ricochet
Star Warrior
Temple of Apshai
Upper Reaches Aps

BOOKS
Basic Ref Manual
Compute Atari DOS
Compute Bk Atari
Compute Magazine
De Re Atari
DOS Utilities List
DOS2 Manual
Misc Atari Books
Op System Listing
Wiley Manual

BUSINESS
Calculator
Database Managemt
Decision Maker
Graph-It
Invoicing
Librarian
Mort & Loan Anal
Nominal Ledger
Payroll
Personal Finl Mgmt
Purchase Ledger
Sales Ledger
Statistics 1
Stock Control
Telelink 1
Visicalc
Weekly Planner
Word Processor

CRYSTALWARE
Beneath The Pyram
Fantasyland 2041
Galactic Quest
House Of Usher
Sands Of Mars
Waterloo
World War III

DYNACOMP
Alpha Fighter
Chompelo
Crystals
Forest Fire
Intruder Alert
Monarch
Moonprobe
Moving Maze
Nominoes Jigsaw
Rings of The Emp
Space Tilt
Space Trap
Stud Poker
Triple Blockade

EDUCATION from APX
Algicalc
Atlas of Canada
Cubbyholes
Elementary Biology
Frogmaster
Hickory Dickory
Inst Comptg Dem
Lemonade
Letterman
Mapware
Maths-Tac-Toe
Metric & Prob Solvg
Mugwump
Music Terms/Notatn
Musical Computer
My First Alphabet
Number Blast
Polycalc
Presidents Of U.S.
Quiz Master
Starware
Stereo 3D Graphics
Three R Math Sys
Video Math Flash
Wordmaker

EDUCATION from ATARI
Conv French
Conv German
Conv Italian
Conv Spanish
Energy Czar
European C & Caps
Hangman
Invit To Prog 1/2/3
Kingdom
Music Composer
Scram
States & Capitals
Touch Typing

EMI SOFTWARE
British Heritage
Cribbage/Dominoes
Darts
European Scene Jig
Hickory Dickory
Humpty Dumpty
Jumbo Jet Lander
Snooker & Billiards
Submarine Commdr
Super Cubes & Tilt
Tournament Pool

ENTERTAINMENT from APX
Alien Egg
Anthill
Attank
Avalanche
Babel
Blackjack Casino
Block Buster
Block 'Em
Bumper Pool
Castle
Centurion
Checker King
Chinese Puzzle
Codecracker
Comedy Diskette
Dice Poker
Dog Daze
Domination
Downhill
Eastern Front
Galahad & Holy Grl
Graphics/Sound
Jax-O
Jukebox
Lookahead
Memory Match
Midas Touch
Minotaur
Outlaw/Howitzer
Preschool Games
Pro Bowling
Pushover
Rabbotz
Reversi II
Salmon Run
747 Landing Simul
Seven Card Stud
Sleazy Adventure
Solitaire
Space Chase
Space Trek
Sultans Palace
Tact Trek
Terry
Wizards Gold
Wizards Revenge

ENTERTAINMENT from ATARI
Asteroids
Basketball
Blackjack
Centipede
Chess
Entertainment Kit
Missile Command
Pac Man
Space Invaders
Star Raiders
Super Breakout
Video Easel

ON LINE SYSTEMS
Crossfire
Frogger
Jawbreaker
Mission Asteroid
Mouskattack
Threshold
Ulysses/Golden Fl
Wizard & Princess

PERIPHERALS
Centronics Printers
Disk Drive
Epson Printers
Program Recorder
RS232 Interface
Thermal Printer
16K Memory RAM
32K Memory RAM

PERSONAL INT from APX
Adv Music System
Banner Generator
Blackjack Tutor
Going To The Dogs
Keyboard Organ
Morse Code Tutor
Personal Fitness Prg
Player Piano
Sketchpad

PROGRAMMING AIDS from Atari
Assembler Editor
Dsembler (APX)
Microsoft Basic
Pascal (APX)
Pilot (Consumer)
Pilot (Educator)
Programming Kit

SANTA CRUZ
Basics of Animation
Bobs Business
Display Lists
Graphics Machine
Kids 1 & 2
Horizontal Scrolling
Master Memory Map
Mini Word Processor
Page Flipping
Player Missile Gr
Player Piano
Sounds
Vertical Scrolling

SILICA CLUB
Over 500 programs write for details

FOR FREE BROCHURES – TEL: 01-301 1111

For free brochures and reviews on our range of electronic products, please telephone 01-301 1111. To order by telephone, just quote your name, address, credit card number, and order requirements and leave the rest to us. Post and packing is FREE OF CHARGE in the UK. Express 24 hour delivery available at an additional charge.

- SHOP DEMONSTRATION FACILITIES — we provide full full facilities at our shop in Sidcup. Monday to Saturday 9am to 5.30pm (closing Thursday 1pm, Friday 6pm).
- MAIL ORDER — we are a specialist mail order company and are able to supply goods direct to your door.
- MONEY BACK UNDERTAKING — if you are totally unsatisfied with your purchase, you may return it to us within 15 days. On receipt of the goods in satisfactory condition we will give you a full refund.
- PART EXCHANGE/SECOND HAND MACHINES — we offer a part exchange scheme to trade in many makes of T.V. game for personal computers.
- COMPETITIVE PRICES — our prices, offers and service are very competitive. We are never knowingly undersold, and will normally match any lower price quoted by our competitors.
- HELPFUL ADVICE — available on the suitability of various computers.
- AFTER SALES SERVICE — available on all computers out of guarantee.
- VAT — all prices quotes above include VAT at 15%.
- CREDIT FACILITIES — we offer credit over 12, 24 or 36 months, please ask for details.

SILICA SHOP LIMITED
Dept C&VG 0982, 1-4 The Mews, Hatherley Road, Sidcup, Kent DA14 4DX.
Telephone 01-301 1111 or 01-309 1111.

SILICA shop

FREE LITERATURE
I am interested in purchasing an Atari 400/800 computer and would like to receive copies of your brochures and test reports as well as your price list covering all of the available Hardware and Software.

Name .....

Adress .....

.....

.....

Postcode .....

(CVG 0982)—Computer & Video Games—Sept. 1982.

PROGRAMS BY POST FROM Software City

*Compare our prices

ATARI

JUST IN FROM THE USA!

Crush, Crumble and Chomp!
You are one of six different monsters let loose to destroy the city. Can they stop you? Hi-res colour, sound over 100 possible scenarios. 48 page manual.
CASS. DISK 32k £17.95

Ricochet
Fast action strategy game that allows you to put pressure on your opponent. 5 game variants. 4 levels of skill.
CASS 16k DISK 32k. £13.95

Dragons Eye
Adventure game with real time battle graphics.
DISK 48k £19.95

Star Warrior
Superb graphics interplanetary adventure game.
CASS. DISK 32k £27.95

Temple of Apshai
Award-winning graphic adventure game.
CASS. DISK 32k £22.95

Rescue at Rigel
You have only 60 mins to save the prisoners.
CASS. DISK 32k £18.95

Invasion Orion
10 space battle scenarios or create your own
CASS. DISK 32k £17.95

Datestones of Ryn
20 mins of fighting and chasing to retrieve the gems.
CASS. DISK £12.95

VIC-20

Bombs Away
Fly your bomber across the landscape and avoid the anti-aircraft fire. Release your bombs and try to destroy the enemies gun positions. £6.95

Home Finance
Calculate payments, interest rates, remaining balances, future balances, annuities and investments. Calculates any unknown given the other variables of the classic interest formulas. Screen prompts step you through each calculation after selecting your purpose from a master menu. £7.95

Reversal
The VIC acts as the board and judge in a two player strategy game. Flank your opponents pieces and see them convert to your colour. Excellent game of strategy and skill. VIC acts as your opponent. 8k expansion required. £8.95

Target Moon
Another hand / eye coordination game involving a manoeuvrable cannon which you use to shoot down various targets. Excellent use of colour and sound. £5.95

Capture
Draw the robots into the landmines and electrified fences while avoiding their sole purpose which is to capture you. Who will win? £5.95

Math Drill
Generates simple addition and subtracton problems for the young user. Uses giant numbers on the screen and rewards correct answers with a colourful display. £6.95

Biorhythm
8k expansion required. Enter your name and birthdate and the day you wish your chart to begin. The VIC will plot three weeks of biorhythms for you on the screen and then pause until you tell it to proceed or start a new chart. Your physical, intellectual and emotional cycles are plotted in different colours which really create an interesting and informative display. £7.95

Household Inventory
8k expansion required. This program will create and manage a household inventory for insurance purposes. Tracks purchase date, cost, description and location. Will total values and print to screen or printer. £9.95

Data Manager
8k expansion required. Allows you to create and manage your own data base. You can define the number of items in a record and add, change, display, delete, search, sort, print, etc. Your data can be stored on cassette when not in use. £14.95

Stock Portfolio Manager
8k expansion required. Tracks last 6 values of each stock and plots trend curves on screen. Provides complete analysis of your portfolio including number owned, purchase date, cost, value, appreciation, yield, etc. £14.95

Moon Lander
This game allows the 'Astronaut' to take over the controls of a Lunar Excursion Module as it is making its descent to the moon. The program provides information via screen displays depicting amount of propulsion, fuel remaining, height and descent speed. In addition the LEM is displayed as it descends to the surface. If the astronaut is not careful, the module can be damaged or even totally destroyed upon impact. £5.95

Wrap
This is a two player game requiring manual skill and dexterity as you attempt to trap your opponent and force him to 'Crash'. The VIC will act as your opponent if you desire. £6.95

Bricks
This game requires skill as you attempt to knock out the various coloured bricks without missing the returning ball. The deeper you succeed in breaking into the wall the higher the value of your score until you break through and truly increase your score. See who can get the highest score. Joystick version. £4.95

Blackjack
Las Vegas style blackjack with the VIC serving as dealer. Two players can play against the house (VIC) utilizing such strategy as 'Doubling Down' and controlling your bets. Each card is displayed on the screen in full colour. The VIC provides an easy way to develop your 'SYSTEM' before actually going to the tables. £5.95

Tennis
The standard game of Paddle tennis with the option of the VIC playing one or both sides of the net. Excellent use of the colour and sound capabilities of the VIC. £5.95

Slots
Try your hand at this 'One Armed Bandit'. See the wheels spin and the handle pull utilizing the VIC's colour and sound capabilities. You can really get arm weary pumping in your money. £4.95

Alien Raiders
The Aliens are invading the Earth and it is up to you to destroy them before they land. The tension increases as you try to accumulate a high score. Joystick version. £6.95

PLEASE SUPPLY ME WITH
THE FOLLOWING PROGRAMS

FOR ATARI 400 ☐ ATARI 800 ☐ VIC-20 ☐

I ENCLOSE CHEQUE FOR £_____
PLEASE SEND ME YOUR LIST OF SOFTWARE, PERIPHERALS AND ACCESSORIES. ☐

All prices include VAT. P&P FREE

NAME

ADDRESS

GALASET LTD 30, BAYFORD R D.
LITTLEHAMPTON, WEST SUSSEX

Nothing is safe from

THE PIRATE

The ULTIMATE program copier!

Though it is not Kansas policy to encourage the copying of programs, the sheer unreliability of imported tapes as prompted many software users to ask us to do something about it.

The problem with the imported tapes is that by the time they eventually reach the user they are in an advanced state of corruption, and with mostly just a single recording, it is essential that a back-up be made.

But here's the crunch--these programs are heavily protected! Which means that no known copy program or Monitor can copy them.

Pirate will.

It does not matter how heavily the program is protected or in fact **how** it is protected. It doesn't matter if it is in machine language with a pre-loader or one of the latest with two separate programs, one loading the other. It can even be a Basic program with a machine language loader attached--**Pirate will copy them all.**

For Pirate differs from every other known copy utility or Monitor, in that it completely ignores the actual program on the tape, but reproduces whatever is there as pulses.

Which means that whatever was on the original tape will be stored in memory then faithfully reproduced onto another tape--protection and all!

The only criteria is that there must be space for both programs, though Pirate takes up very little user RAM.

For Video Genie and Tandy Model I. Available only from Kansas. £14.50 Vat and post paid.

Kansas

Return first class post service guaranteed. Credit card holders ring in your order before 4pm for delivery tomorrow! Or use our 'after hours' answering service for delivery by first available post. Full descriptive catalogue available upon request. Remember, all Kansas software carries an unconditional guarantee (so if it fails in say five years time it will still be replaced--free!). Not available from shops.

Kansas City Systems, Unit 3, Sutton Springs Wood, Chesterfield, S44 5XF. Tel. 0246 850357

GAMES SAY

Life and games are governed by strategies and tactics. That's what makes game playing interesting. ARNOLD ARNOLD, in the last of his articles on the deeper meanings behind the games people play, deals with the general solution of the chess problem — with Noughts and Crosses thrown in for good measure.

A recent article in this magazine suggested that it is impossible to look at every variation for the game of Chess or even for the game of Noughts and Crosses.

But all variations for Noughts and Crosses can now be calculated precisely on a computer, but you would have to play for 28,519 years — day and night — at three minutes per game to play out all of them.

The game of Noughts and Crosses offers five thousand million variations.

Chess involves a far larger sum that is also calculable now. You'd run out of time and paper in the universe if you were to try to play all of them. The principles for both games are the same, despite the different conditions of play.

Games of pure strategy are those where all the facts are fully visible to the players throughout. No secret or randomised factors are every involved, except the intentions of the players — or so it was believed until now.

As stated earlier, the sum of possible intentions is now a calculable entity. Chess is enormously complex and Noughts and Crosses very simple, but the principles are the same although the details differ. Let us see what all of this means in so far as one of the simpler games is concerned. The same meanings will be found to hold true for more complex games.

The only error free and therefore perfect game between equals always ends in a draw. An early draw is a game in which both players can foresee what is conventionally called a stalemate. But a stalemate is merely a misunderstood draw played to the last or last-but-one turn.

That's true for both Noughts and Crosses and chess, although champions are usually reluctant to admit it. Either game is won only by default — i.e. by trading on or inducing mistakes in the other player.

That means employing tactical feints — dirty tricks — waiting for the other to do something stupid and careless, or by inducing such errors by means of perpetual psychological warfare. Bobby Fischer was an expert at such ploys.

In chess, Noughts and Crosses or Go, most players believe that they have an advantage if they have the first move (i.e. white in chess). The fallacy of that belief is best illustrated by what occurs in Noughts and Crosses.

The sum of all choices for both players = 45. The first moving player enjoys 25 of these (9+7+5+3+1) and the second only 20. The first moving player therefore has a severe numerical disadvantage in winning terms. He can make five more mistakes than the second moving player. But both have an equal opportunity to foresee or achieve an error free result — a draw — if both play flawlessly.

This can be tested quite simply. Try for the earliest victory. The first moving player has an advantage there. He has the earliest opportunity to trade on his partner/opponent's mistake, but only if the second moving player is immature, inexperienced, inattentive, stupid, drugged, drunk or insane.

But what has the winner won? He has won by default. Later on in the game, and if he blunders, the first moving player can lose just as easily.

So the whole thing is largely a matter of attention, attitude or doing things by the numbers, or lack of any of these. Of the five thousand million possibilities for Noughts and Crosses, only six need to be considered seriously.

These are: the non-game; the win: lose game; the early draw; the stalemate; the interrupted game; or the game played in violation of the rules.

No other outcomes are possible and all are caused by strategies and tactics or randomness, no matter which games you play or by which rules. The draw is the only balanced outcome, based on an absence of any error.

Any seeming deviation from these principles can only be due to artificially created scoring imbalances or by looking only at 2 × 2 games.

The only conclusions are that people win in the conventional sense because they have the wrong values, consider too much or too little data, don't understand what they are doing or fail to pay attention.

Others lose because they don't understand, don't pay attention, or allow themselves to be distracted and victimised.

The only equal players are those who achieve a draw and who understand what that means. In the highest sense the draw means perfection, perfect cooperation between equals, balance, peace and harmony.

What should interest game afficionados is that it is far more difficult to achieve a conscious draw than a victory. Try playing Noughts and Crosses on a 9 × 9 diagram with a winning requirement of 5-in-a-row.

Try for the earliest draw systematically, symmetrically and then assymetrically and you'll really have a challenge on your hands, whether you play with a computer or with a human being.

These obvious principles should have been understood long ago. But they were only understood in the orient. Most chess championships end up with a long series of draws and stalemates until the required number of games are won — by default.

The best games these champions play are said not to count. Prize money is only awarded to the "winner." Playing to win solely for the sake of money corrupts.

It fools all those who don't understand or don't want to understand. The first can be excused because they have been victimised by wrong beliefs of long standing.

They have been conditioned to believe all the wrong things. The latter are simply unprincipled opportunists, people who want to win at any cost.

This should not discourage people who play games for fun or to discover the meanings of games. Achieving a draw with an equally matched game partner is a considerable achievement.

Games are amusing, fascinating and important, especially now that we have the capacity to model games with precision on any computer or calculator. We can therefore discover the cause and consequences of every move AND of every player's intentions.

We can be sure of who plays for the sake of trying to achieve perfection, cooperation and peace and who merely wants to victimise us.

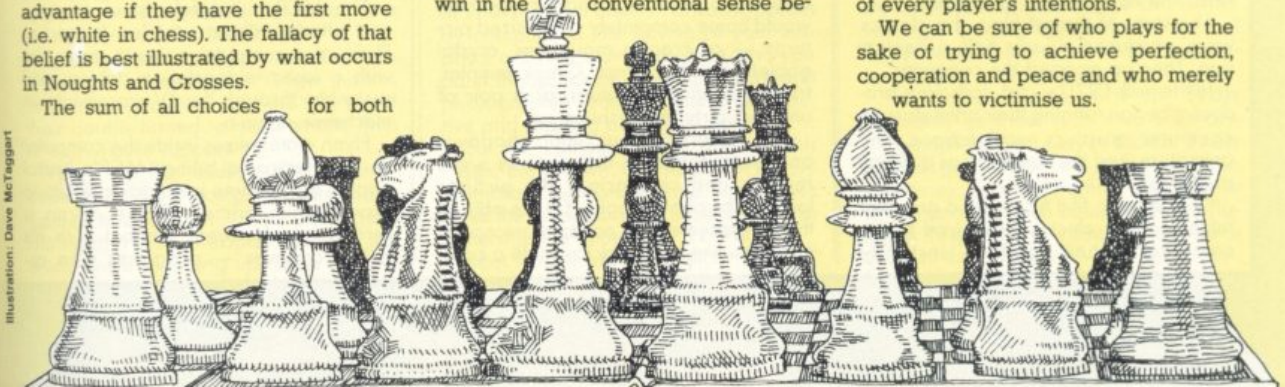
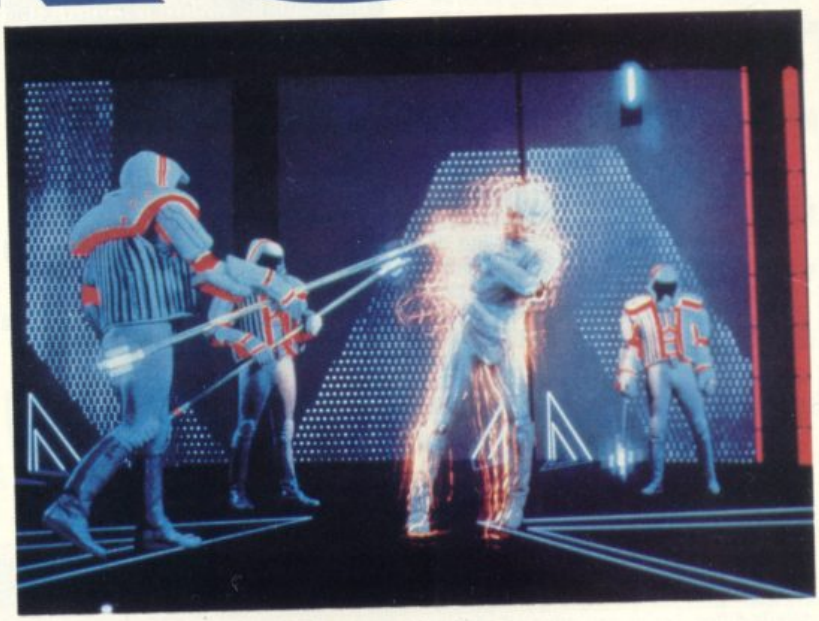


Illustration: Dave McTaggart

THE MAKING OF

TRON

BY FRED D'IGNAZIO



One day, just a few months ago, two men were squeezed inside a cramped trailer on a Walt Disney studio backlot in Burbank, California. They were peering intently at a computer picture screen.

At first the screen was blank. Then glowing, darting images appeared: Giant, horseshoe-shaped flying battleships. Telephone receivers that raced across a fishnet of pure light. Squat, sleek tanks that fired deadly energy bolts.

The inside of the trailer echoed and rocked with the men's impromptu applause, laughter, and sudden arguments. Then silence.

One man scribbled notes on a sheet of paper. The other pushed buttons on a keyboard below the screen. The tanks moved forward, then backward, then forward, all in slow motion. The battleships — alias *Recognizers* — rotated and approached until they loomed on the screen.

The telephones — alias *light cycles* — froze in place on the infinite grid, then inched forward and collided in a burst of blinding light.

What were the men doing? It appeared as if they were playing a sophisticated video game. But they were not playing a game. They were making a movie.

The two men were Jerry Rees and Bill Kroyer, two Disney animators with impressive credits. Both had worked on a number of animated films for Disney and other producers. Rees recently worked on **Pete's Dragon**. Kroyer helped to animate **The Fox and the Hound**.

Now the two were working on **Tron**, the story of a renegade video game designer's heroic battles in a microscopic fantasy world inside a computer.

In the olden days at Disney — the 1930s through the 1950s — animation was tedious and time-consuming. Dozens of animators laboured painting endless sheets of clear plastic *cells* which were later strung together into a feature-length animated film. It became so expensive, in terms of animators' salaries, that high-quality animated films became rare. The field ceased to evolve.

The state-of-the-art films, the classics, were produced nearly half a century ago. Then up popped the computer.

In the mid-1970's, cost-conscious producers began training their animators on computer graphics workstations. The animators used the computer as a *digital paintbrush*.

They drew a film frame on a graphics tablet with an electric pen wired to the computer. Their picture instantly appeared on the computer's TV screen. At the bottom of the screen stretched an electronic palette — a row of twenty or thirty blocks, each a different colour.

To colour his picture, the animator had only to touch the palette with his pen, then lightly tap the screen. In a few seconds, an artist could colour an entire scene.

Animators let the computer do their colouring. They also let it do entire frames. These frames, known as *in-betweeners*, were mid-points in an action scene. For example, if the hero leaped onto his horse, the animator only needed to draw the beginning and ending film frame. The computer could interpolate all the frames in between and draw them itself.

The animators' early programs were known as *paint* programs. The artists still drew most of the film frames, but the computer helped them work faster.

Then computer scientists discovered a way for the computer to *grow* scenes on its own, completely from scratch. A scientist with no artistic ability could feed the computer a mixture of numbers and complex mathematical formulas, and out would come completely synthesized pictures — of craggy mountains, crystal goblets, bowls of fruit, Greek temples, trees, the rings of Saturn, or a pair of unlaced, dirty tennis shoes.

The texture, colour, light, shadows, and perspective in the pictures were realistic and convincing. The pictures looked like photographs. Yet the objects they represented did not exist, except as minute pulses of electricity inside a computer.

In 1977, Steven Lisberger, a talented young director, called on the executives at Walt Disney Productions at their headquarters on Dopey Drive, in Burbank, California. Lisberger had a fabulous movie to propose, and he wanted Disney to produce it.

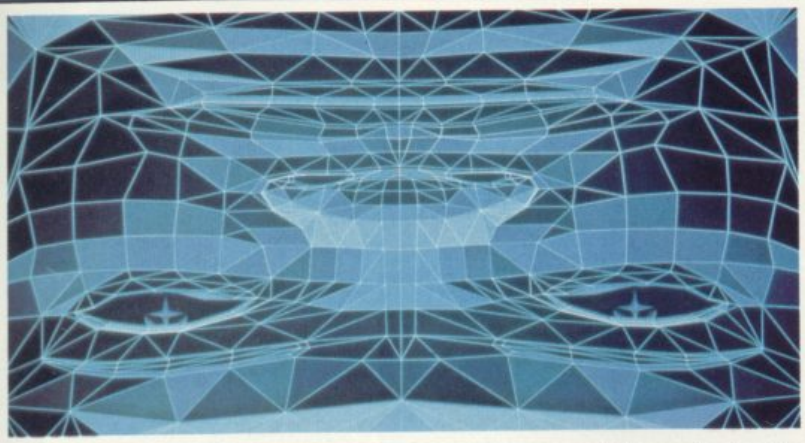
Like fellow director, Steven Spielberg, Lisberger had grown up on magical Disney films like **Snow White**, **Pinocchio**, and **Fantasia**. Now he wanted to bring a little of that magic back to Disney studios where it hadn't been seen for almost fifteen years.

Lisberger had dreamt up a story about Kevin Flynn, a maverick hero who sets out to conquer evil in this world and in a surreal world in the bowels of a supercomputer.

Lisberger's script began with Flynn trying to crack into his old company's computer to locate evidence that his arch-enemy, Dillinger, had swindled him out of several video games he had invented. Bu the computer is controlled by MPC, an ultra-intelligent "Master Control Program".

The MCP is hateful, power-hungry, and utterly without scruples. It catches Flynn at a computer console, zaps him with a laser teleportation device, and sucks him through the TV screen into its electronic domain.

Flynn materializes inside the computer as an electronic being. MCP's brutal guards shove Flynn into a jail cell. Like a gladiator in ancient Rome, Flynn is forced into frequent combat with his fellow captives — programs who re-



sisted MCP and remain loyal to their mythical human *users*.

At the last moment, Flynn discovers an ally: the valiant program, Tron, champion of the human users. Flynn, Tron, and another program, Ram, battle the MCP's warriors on light cycles.

The cycles flash across the game grid leaving multi-coloured energy "walls" in their wake. The walls accumulate forming a maze that the cycles must manoeuvre through and around. The cycles travel at blinding speeds. If a cycle strikes a wall, it explodes and it's rider dies.

Lisberger told Disney executives the story of Flynn and Tron's adventures in the bizarre world ruled by MCP. He described Flynn and Tron's battle to overthrow the MCP, and Flynn's frantic attempt to escape from the computer.

To the conservative executives, Lisberger's film sounded exciting but risky. They were sceptical. They became even more sceptical when Lisberger proposed that the film be completely animated — by computer.

Lisberger's idea was ingenious: He wanted to use computers to create the world inside of the computer.

Lisberger persuaded the executives to let him do a movie pilot. A few months later, the executives saw the pilot, and their doubts turned to amazement, then to enthusiastic support.

When the film finally went into production in 1980, computers and video games had caught up to Lisberger's amazing vision. People all over the world were snapping up home computers and popping billions of coins into computer arcade games.

Also, by 1980, Lisberger had decided not to rely completely on computer animation. He realised that live actors could bring a lot of energy and excitement to the film. He decided that the best combination was a mixture of live action, special effects and animation.

The animation would be done partly by computer and partly by Disney animators. But all of the parts — live action, special effects and animation — had to be blended together into a single film.

The live action in the film was shot in just a few months. The post-production special effects took two years. Of the film's total cost of over $22 million, approximately $6 million went into live-action enhancement. Another $5 million went into computer-generated imagery.

Lisberger wanted the final film to look unique, like something no one had ever seen before. Yet he wanted it to be convincing, believable and real. Live action had to flow invisibly into computer animation. Computer animation had to flow into special effects.

Human animators painted scenes and backdrops that looked as if they were generated by a computer. Film-making computers created characters and effects that looked as if they were painted by humans. Scenes with live actors on barren sound stages were touched up by animators and refilmed with crimson and blue "backlights" glowing brightly through the actor's costumes, the props and the surrounding geometric landscape.

The result is that the live actors seem to be moving through a computer world created totally by a computer. In fact, out of a total of almost one hundred minutes of film, only 15 minutes are computer generated.

According to Richard Taylor, director of **Tron** special effects: "Creating scenes by computer is like having at your disposal a flawless airbrush artist who can paint thousands of paintings a day with photographic realism, getting perspective and shading absolutely perfect."

But the computer can't work all this magic on it's own. It needs help. Disney animators Bill Kroyer and Jerry Rees gave the computer the cues it needed to generage the images for **Tron**.

Rees and Kroyer's trailer in Burbank was connected, over the telephone to a high-speed mainframe computer located on the other side of the country, in Elmsford, New York. The computer was run by a team of animators and engineers of the MAGI company, one of four computer-graphics companies that worked on **Tron**.

Back in Burbank, Rees and Kroyer fed the computer with a steady diet of storyboards and scene blueprints. They described every aspect of every frame they wanted the computer to produce.

Rees and Kroyer drew upon all their animation experience at Disney to produce the specifications. Computer operators at MAGI then loaded these specifications into the computer as cold, hard numbers.

The computer ran MAGI's "Synthavision" programs to convert the numbers into speeding light cycles, sinister Recognisers, canyons, bridges and tanks. It created the images out of stacks of 3-D building blocks. The building blocks, known as geometric *primitives* included spheres, cones, cubes and ellipsoids. The primitives were added together, subtracted from each other, shrunk, expanded or distorted to make complex looking objects.

The objects were set into motion and transmitted, via the phone line, back to Rees and Kroyer's trailer in California. The animators watched the scenes in miniature on their computer TV screen.

Elsewhere, other computers were busy cranking out other scenes in the film. At Information International, in Culver City, California, a computer was transforming billions of numbers into the jeweled polygons used to build the beautiful *solar sailer* that carries Tron and Flynn to the MCP's headquarters.

Computers at Robert Abel and Associates in Los Angeles were working on the **Tron** titles and Flynn's thrilling journey from the real world into the circuit world inside the computer.

At Digital Effects in New York City, engineers programmed their computer to create one of **Tron's** most memorable characters, a computer *bit*.

The bit could metamorphose it's shape. Sometimes it was a hovering, spiked sphere, other times a floating octahedron. It acted briefly as Flynn's sidekick but could only supply two answers: yes or no.

In the U.S. the film was first released on July 9. Critics of the movie surfaced immediately, decrying it's shallow, comicbook characters, it's weak plot and it's overuse of special effects. According to one reviewer: "Walt Disney never forgot the importance of plot and of making the audience care about the characters. Lisberger has a great deal of talent, but **Tron** would have profited from remembering such basics."

The critic's observation is apt. **Tron** frequently gets lost in its own wizardry.

Perhaps the best way to look at **Tron** is as the grandaddy of a new generation of movies. **Tron** is the first, bold step to a new era in which computers and humans together produce films more magical than anything we've ever seen.

SPACE INTRUDERS WITH MUTANTS

- Four different types of Alien.
- Random saucer gives mystery points.
- Mutant Alien from second Attack-Wave.
- Bonus base at 50,000 points.
- Aliens explode when hit.
- Left, right and fire.
- Full sound effects and colour.

METEOR STORM WITH SPEECH

- Three different types of meteor.
- Two different saucers.
- Full screen wrap-around.
- Bonus ship every 10,000 points.
- Superb explosions.
- Left, right, thrust, fire and hyperspace.
- Sound effects and speech.

BOTH OF THESE FULL FEATURE GAMES INCLUDE:

- Personalised high score table.
- Hold feature, suspends game at any time.
- Progressive difficulty.
- Full "Attract Mode" with instructions and scores.

Supplied on Cassette. Both run in 16K

SEE US AT THE MICROFAIR Microscene Brum '82 show and the P.C.W. Show.

Send order to: QUICKSILVA, Dept SPA, 92 Northam Road, Southampton SO2 0PB

ORDER COUPON

Please send me:
SPACE INTRUDERS at £5.95 each
METEOR STORM(S) at £5.95 each
I enclose a cheque or P/O for

£_____
(cheques payable to QUICKSILVA)

Name:_____

Address:_____

Kit Korner

CHIPS WITH EVERYTHING

As an introduction to the exciting field of specialised kit building I am looking at the use of the many peripheral chips available for each of the most popular microprocessors. In later articles, I will be looking at quite a few add-ons which you can easily make up yourself with the minimum of effort. Most of the kits will be usable with any of the systems with little or no modifications.

I have been looking at two particular chips which would suit a number of systems. These are the 6828/8507, a Priority Interrupt Controller, and the 6840, a Programmable Timer Controller. These two chips have been designed for use with the 6800 system but are also equally at home with the 6500 system. It is, of course, possible to adapt the control signals from other systems to comply with those required for these chips.

My purpose for using the 6840 was to time the switching the drive signals to a stepping motor to drive a robot mouse. The robot is required to go around corners and by writing different subroutines into the timer the mouse will perform the turns. I have yet to see whether this is a satisfactory method, but even if it is not I will certainly be able to use it in another project.

The 6840 is part of the memory map in the system and is directly addressable via the bus. The information is placed in the internal registers. There are three 16-bit counters, which decrement, and a set of control lines for each of the counters.

Continuous square waves are possible by using two of the counters. The square waves may be of variable mark/space ratio, but only of one polarity as the chip, unlike some other peripherals, is powered by a single five-volt rail.

This is a useful chip, the 6840, and can be very helpful when the clock of the microprocessor is not of the right frequency or phase. It is very useful when the system is tied up doing other routines and a timing loop of variable frequency is required, which may be difficult to generate by the microprocessor.

The 6828/8507 chip, on the other hand is suitable for the inputs to a system, whereas the 6840 is designed for control applications. One use that comes to mind at this moment is associated with game playing.

Consider a game with two players. One player succeeds in knocking out the opponent's gun. This would normally mean an end to the game. In more realistic battle the enemy would usually have more than one piece of armament.

Would it not be better if the game could continue with the player using a less powerful gun? With the controller chip the actions of one of the players may be slowed or impeded by the routines stored at various locations accessible by the different interrupts whose locations are stored in its registers.

The priorities assigned by this chip are, like the timer, changeable directly by the microprocessor so that the program may vary without the players suspecting it. This can add another dimension to games which may not be all that exciting in the first place, especially when there is a possibility of more than two players taking part.

The priority chip can, of course, be used for more serious applications which I will outline in the coming months. Also I will be showing you some of the routines which are commonly applied to them. There are of course many more chips which have uses for the hobbyists.

It is well worth looking out for generally available chips and also the dedicated ones which are designed for a specific purpose. These can often be adapted for strange and extraordinary uses.

I will also be looking at some of the methods of constructions I used in the first few editions so that those who missed them then will not be at a disadvantage when it comes to kit building. I look forward to some of your enquiries on how to tackle problems which have arisen in trying to create new add-ons and other hardware extras.

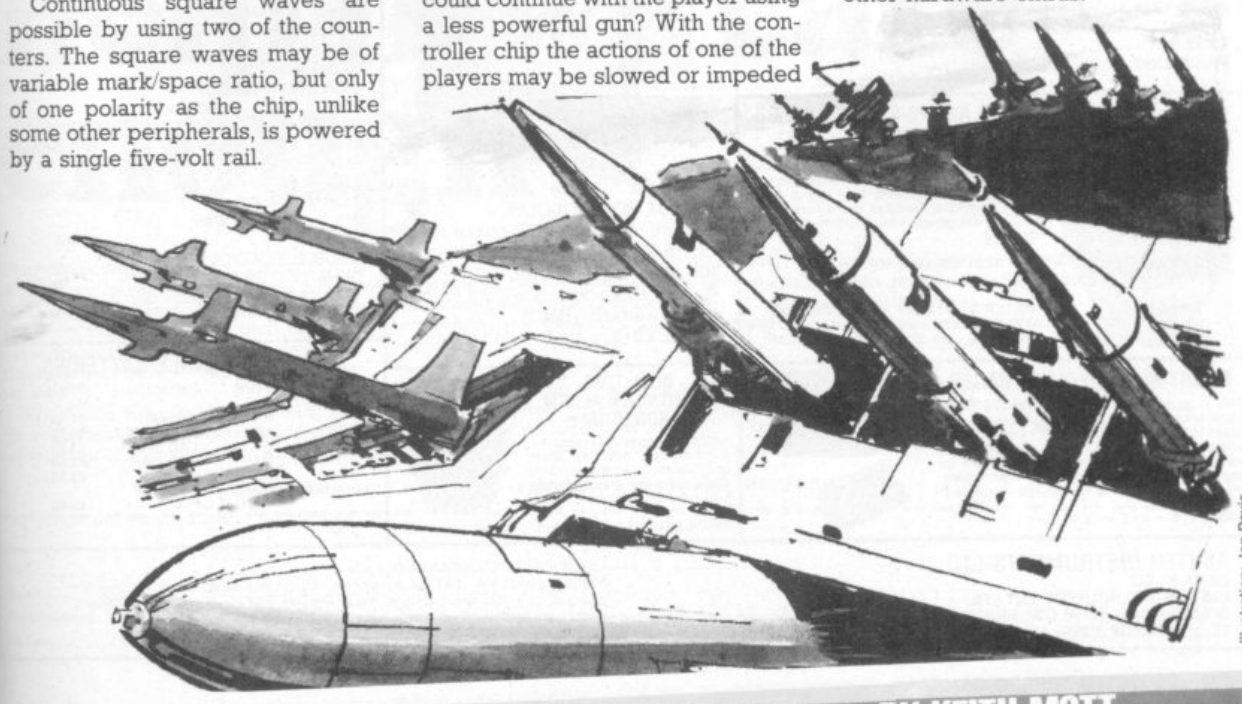


Illustration: Jon Davis

BY KEITH MOTT

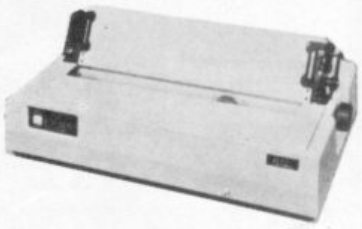
SEIKOSHA GP–100A GRAPHIC PRINTER

SPECIAL OFFER

Features: Graphics, double width char., standard char., speed CPS, selectable line spacing, adjustable paper width up to 10 inches, 80 columns, centronics compatible parallel interface.
90 day warranty.

Price
£179 + VAT + £4.50 Carr.

OK1 MICROLINE PRINTERS



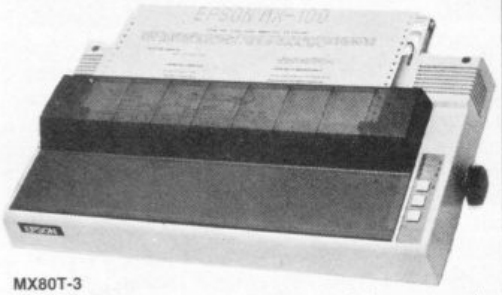
90 day warranty on all Microline printers (OK1)

MICROLINE 80
Features: 80 columns, 80 CPS, friction and pin feed, Unidirectional block graphics, Centronics parallel interface.
PRICE £249 + VAT + £4.50 Carr.

MICROLINE 82A
Features: 80 columns, 80 CPS, friction and pinfeed, bi-directional printing, parallel and serial (1200 bauds) interface.
PRICE £379 + VAT + £4.50 Carr.

MICROLINE 83A
Details as 82A but 120 CPS and includes tractor up to 15 inches width.
PRICE £569 + VAT + £4.50 Carr.

NEW EPSON TYPE 3 PRINTERS



MX80T-3
Features: 80 columns, 80 CPS, Bit image printing, super and sub scripts, Auto-underlining, tractor feed, 32 print fonts, Bi-directional, logic seeking, 9x9 matrix, centronics parallel interface.
PRICE £319 + VAT + £4.50 Carr.

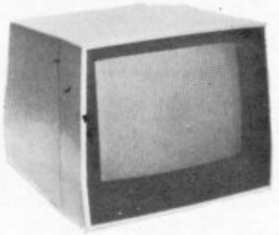
MX80 F/T–3
Features: As above but with tractor or friction paper feed.
PRICE £325 + VAT + £4.50 Carr.

MX100–3
Features: 136 columns, 100 CPS, Auto-underlining, 32 print fonts, friction or tractor paper feed, Bi-directional logic seeking, true decenders, adjustable paper width up to 15 inches, Centronics parallel interface.
PRICE £429 + VAT + £4.50 Carr.

MX82
Features: 80 CPS, plotter print, bit image printing, bi-directional printing with logic seeking.
PRICE £329 + VAT + £4.50 Carr.

MX82 F/T
PRICE £339 + VAT + £4.50 Carr.

GREEN MONITORS



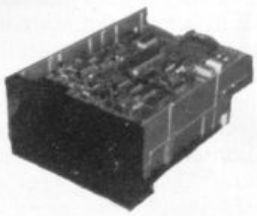
SANYO PROFESSIONAL MONITOR
SM12H — Green/black 12 inches screen, 18 MHz bandwidth, removable antiglare filter, ideal for high res graphics, attractive beige case — illustrated above.
1 year warranty (SANYO)
PRICE £89 + VAT + £4.50 Carr.

BMC 12A GREEN MONITOR
12 inch green/black screen, 80 x 24 char. format, composit video input. 15 MHz bandwidth.
1 year warranty (BMC)
PRICE £69 + VAT + £4.50 Carr.

COLOUR MONITOR

BM1401 RGB COLOUR
Medium resolution RGB colour monitor, 15 MHz.
400 dots (at the centre)
40 x 25 characters, 5 x 7 dot format.
1 year warranty (BMC)
PRICE £219 + VAT + £4.50 Carr.

TOSHIBA DOUBLE SIDED/DOUBLE DENSITY 5¼" DISK DRIVES FOR THE PRICE OF A SINGLE SIDED/SINGLE DENSITY.



Industry standard interface, compatible with VIDEO GENIE, ATOM, TRS80, BBC COMPUTER, SUPER BRAIN, NASCOM, and lots of others. 3.5 MEGABITS. Unformatted storage capacity, track density 48 TPI. Daisy chain up to 4 drives.
90 day warranty.
DISK DRIVE ND-02D
£169 + **VAT** + £2.50 Carr.
SINGLE BOXED WITH POWER SUPPLY
£199 + **VAT** + £4.50 Carr.
DUAL BOXED WITH POWER SUPPLY
£369 + **VAT** +£4.50 Carr.
2 DRIVE CABLE
£15 + **VAT** + £1 Carr.

DOUBLE SIDED/DOUBLE DENSITY DISKETTES
1 – 9 **£2.75** + **VAT** + 50p Carr.
10–49 **£2.50** + **VAT** +£1 Carr.

CASIO AX-210/AX-250 ANALOG AND DIGITAL WATCHES

Dual time, 12 or 24 hour option, countdown timer with memory function, chronograph with lap time, optional hourly time signal, daily alarm, 3 optional melodies or ordinary bleeper. Calendar display, lithium battery. Stainless steel brc.

THE BEST SELLING WATCH
AX-210 or AX-250 **£21** + **VAT** + 50p Carr.

WATER RESISTANT ALARM/CHRONO
W20 Black resin case **£10** + **VAT** + 50p Carr.
W30 Metal case **£16** + **VAT** + 50p Carr.

RECHARGEABLE BATTERIES

CODE	TYPE	CAPACITY	PRICE
S401	AAA	200 mAH	**£1.10**
S101	AA	500 mAH	**£0.75**
C1200	C	1200 mAH	**£1.90**
D1200	D	1200 mAH	**£2.05**
RX22	PP3	110 mAH	**£3.50**
BC2204	Universal Charger for AA, C,D & PP3		**£9.50**

Please add VAT to all above prices plus 75p Carr per order.

SILENT ALARM/POCKET PAGER

This is an individually coded 4 WATTS Radio transmitter and pocket pager receiver. The alarm system has connections for door contacts and vibration sensors. 2 vibration sensors are included. It has a range of 2 miles. Ideal for protection of vehicle or property. Power requirements for transmitter is 12V dc. Not licensible in UK.
PRICE £78 + **VAT** + £2.95 Carr.

DUAL TIME COUNTDOWN ALARM CHRONOGRAPH.

12/24 hr selectable display, chronograph with lap time, countdown timer/alarm, 24hr alarm with 5 min snooze facility, fully adjustable stainless steel strap.
PRICE £8 + **VAT** + 50p Carr.

AKHTER INSTRUMENTS LTD,
DEPT C&VG
UNIT 19, ARLINGHYDE ESTATE,
SOUTH ROAD, HARLOW, ESSEX. UK.
TEL: HARLOW (0279) 412639.

ORDERING INFORMATION:
Please add 15% VAT to all prices. All orders which accompany a cheque or cash are carriage free. Please add carriage for all other orders as specified on each item
WE ACCEPT BARCLAYCARD AND ACCESS

LANDAU ELECTRONICS LTD.

EDUCATION
Pre-School Early Learning Fun £16.95
Early Reading £26.95
Beginning Grammar £19.95
Hangman £24.95
Number Magic £14.95
Addition/Subtraction I £26.95
Addition/Subtraction 2 £26.95
Multiplication I £26.95
Teach Yourself Basic £9.95
Teach Yourself Extended Basic £9.95
Market Simulation £9.95
Music Maker £26.95

ENTERTAINMENT
Video Games 1 £24.95
Video Chess £39.95
Hunt the Wumpus £24.95
Indoor Soccer £24.95
TI Invaders £19.95
Tombstone City £24.95
Car Wars £24.95
Adventure Land £24.95
The Attack £24.95
Blasto £24.95
Blackjack and Poker £24.95
Hustle £24.95
Oldies But Goodies - Games I £9.95
Oldies But Goodies - Games 2 £9.95
Munchman £26.95

HOME FINANCE/SCIENCE
Household Money/Budget Management £24.95
Personal Record Keeping £49.95
Statistics £39.95
Mailing List £49.95
Personal Financial Aids £9.95
Maths Routine Library £24.95
Electrical Engineering Library £24.95
Structual Engineering Library £24.95
Speech Editor £19.95
Programming Aids 1 £9.95
Programming Aids II £19.95
Programming Aids III £19.95

ADDITIONAL EQUIPMENT
Extended BASIC £89.95
Editor / Assembler £89.95
Logo £135.95
UCSD Pascal Synthesizer £99.95
RS232 Card £109.95
Ram Expansion Card £199.95
Matrix 80 Col. Printer £399.95
Cassette Cable £11.95
Joysticks £24.95
Peripheral Expansion system £169.95
Disk Controller Card £135.95
Disk Drive Internal £259.95

All Prices include VAT
A selection from our vast range
THE HOME COMPUTER SPECIALIST
Barclay & Access card accepted
Inquire about our soft ware club

HOME STUDY
Inv. To Programming I £15.95
Inv. To Programming 2 £22.95
Inv. To Programming 3 £22.95
Conversational French £39.95
Conversational German £39.95
Conversational Italian £39.95
Conversational Spanish £39.95
Energy Czar £9.95
European Countries & Caps £9.95
Hangman £9.95
Kingdom £9.95
Scram £17.50
States & Capitals £9.95
Touch Typing £15.95
Music Composer (Cartridge) £35.95

HOME ENTERTAINMENT
Asteroids £29.95
Basketball £24.50
Blackjack (Cassette) £9.95
Caverns Of Mars (Disk) £24.50
Centipede £29.95
Computer Chess £24.50
Missile Command £29.95
Pac-Man' £29.95
Space Invaders £29.95
Star Raiders £29.95
Super Breakout £24.50
Video Easel £24.50

PROGRAMMING LANGUAGES & AIDS
Assembler Editor £39.95
Atari Basic Cartridge £39.95
Micro Assembler (Disk) £59.95
Microsoft Basic (Disk) £59.95
Pilot (Consumer) £54.00
Pilot (Educator) £79.95
Entertainer Kit £69.95
Programmer Kit £45.00
A.P.X. and Thorn / EMI Software Stocked

ADDITIONAL EQUIPMENT
A410 Program Recorder £50.00
A810 Disk Drive £299.95
A822 Thermal Printer £265.00
A850 Interface Module £135.00
CX853 16K Ram Pack £65.00
CX3004 Paddles (Pair) £13.95
CX4004 Joysticks (Pair) £13.95
CX81 I/O Cable £12.95
CX86 Printer Cable £28.50
CX87 Interface Cable £23.50
CX88 RS232C Cable £25.00
CX89 Monitor Cable £25.00
CX8104 D)S2 Master Diskette £21.95
CX404 Word Processor (Disk) £99.95
CX4103 Statistics 1 £13.95

For details of our full range, and mail order list send large SAE to:-
Landau Electronics Ltd. Lion House, 227 Tottenham Court Road, London W1.
01.580 7383 Ex.28 For prompt dispatch, quote Barclay or Access card No.
(Also at 215 High Street ,Sutton, Surrey. 01.643 5494)Prices as going to press.

We can all help if we care enough...

A special from Educational Computing

Many people regard computers as some form of man-made monster, heralding the advent of an era where machines are the masters of men. The emergence of microcomputers in the mid-seventies has helped to overcome this misguided view of how computers will affect our lives.

Each month, Educational Computing shows the tremendous advances being made in the enhancement of computers, particularly micros, as teaching aids. In this annual issue, **Learning to cope — computers in special education,** we look at the marvellous achievements of many very dedicated people working with disabled and mentally-handicapped children.

Tremendous progress is being made in this area, brought about by a mixture of ingenuity, flexibility and determination on behalf of the manufacturers of specially-adapted products, writers of applications software, nurses and teachers putting ideas into practice and the children themselves.

In our annual, we look at the latest developments in special education. You can read about the many fascinating applications of microelectronics in this field, what the people involved think and what the future holds in store. Most important of all, you can find if you can help — even in a small way.

Learning to cope — computers in special education £1.50

Please send me a copy of *Learning to cope — computers in special education.*
I enclose a cheque/postal order made payable to Educational Computing for £1.50 (including P&P).

Name _____
Position _____
Establishment _____
Address _____

Now please post to: Learning to cope — computers in special education, 8 Herbal Hill, London EC1 5JB.

dk'tronics ZX 80/81 SPECTRUM Hardware Software

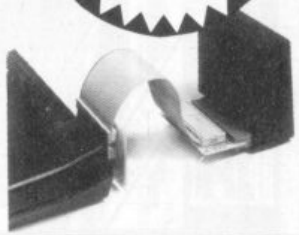
ZX KEYBOARD

Fully cased with numeric pad £45
Uncased with numeric pad £30
Case £15

SPECTRUM MEMORY UPGRADE TO 48K £39.95

NEW FROM dk'tronics

(A) 16K Ram Massive Add On Memory
Fully assembled and tested £19.95
(B) 64K Memory Expansion £49.95
(C) 4K Tool kit full of utilities to aid the programmer in constructing and de-bugging E. Prom version for use with graphics Rom £9.96
Cassette version £6.95
(D) Flexible ribbon connector (as illustrated) £10

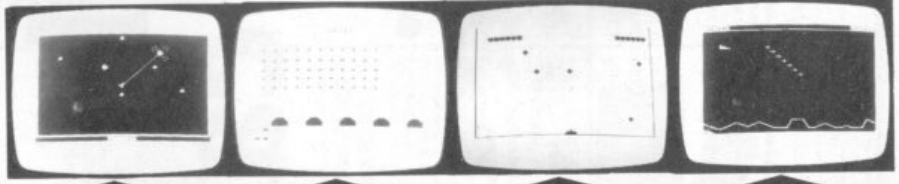


4K Graphics rom

SOME OF THE GRAPHICS NOW POSSIBLE ON THE ZX81

The DK Graphic module is our latest ZX81 accessory. This module, unlike most other accessories fits neatly inside your computer under the keyboard. The module comes ready built, fully tested and complete with a 4K graphic ROM. This will give you an unbelievable 448 extra pre-programmed graphics, your normal graphic set contains only 64. This means that you now have 512 graphics and with their inverse 1024. This now turns the 81 into a very powerful computer, with a graphic set rarely found on larger more expensive machines. In the ROM are lower case letters, bombs, bullets, rockets, tanks, a complete set of invaders graphics and that only accounts for about 50 of them, there are still about 400 left (that may give you an idea as to the scope of the new ROM). However, the module does not finish there; it also has a spare holder on the board which will accept a further 4K of ROM/RAM. This holder can be fitted with a 1K/2K/RAM and can be used for user definable graphics so you can create your own custom character sets.

£29.95



★ASTEROIDS ★SPACE INVADERS ★CENTIPEDE ★DEFENDER

16K GRAPHICS ROM SOFTWARE

dk'tronics

23 Sussex Road,
Gorleston,
GREAT YARMOUTH,
Norfolk.
Tel: (0493) 602453

Send off the coupon today or telephone Gt. Yarmouth for our answering service (available 24 hrs. a day, 7 days a week) quoting Barclaycard or Access number.
(Please add on £1 for P/P).

Access BARCLAYCARD VISA

Please state type of machine, which ROM memory size, quantity and price when ordering.

Please send me ..... @ £ .....
Please send me ..... @ £ .....
Please send me ..... @ £ .....
Please send me ..... @ £ .....
Please send me ..... @ £ .....
Please add on £1.25 for P/P. I enclose £ .....
Name .....
Address .....

Cheques/P.O. payable to D.K. Tronics.

LET ACORNSOFT OPEN THE DOORS TO YOUR IMAGINATION

BBC Microcomputer or Acorn Atom

Acornsoft is the software division of Acorn Computers, designers and manufacturers, of the BBC Micro and Atom. We know better than anyone the capability of the machines, we know how to get the very best from the hardware. And we have produced a range of exciting games, exacting business and useful household software.

The Biggest Range Available

Acornsoft software ranges from authentic arcade games like Snapper to Algebraic Manipulation to Desk Diary to other languages like FORTH and LISP. Striking colour, amazing sound effects and powerful graphics are all used to the full. And it does not stop there. There is a complete range of manuals, accessories and plug-in ROMs.

Free Brochures

Just clip the coupon or write to us and we will rush our catalogue absolutely free. Can't wait for the post ring 01-930 1614 now! Don't delay – do it today. Let Acornsoft help you get the best from our machine and open the doors to your imagination.

Acornsoft and Atom are registered trade marks of Acorn Computers Ltd.

ACORNSOFT
4A Market Hill,
CAMBRIDGE CB2 3NJ.

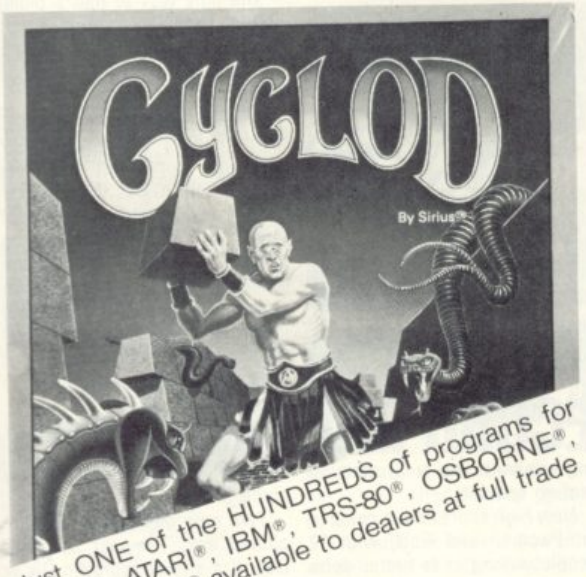
Please rush me my free literature from Acornsoft.

☐ Atom ☐ BBC Please tick

Name

Address

Postcode



Just ONE of the HUNDREDS of programs for APPLE®, ATARI®, IBM®, TRS-80®, OSBORNE®, PET® & VIC-20® available to dealers at full trade discount*.

AUD (Software Distribution)
131 Lord Street, Hoddesdon, Herts., EN11 8NG. Tel Hoddesdon 68870.

A Fast Action Game From Sirius™
FOR THE ATARI 800 COMPUTER
With 48K And One Atari 810 Disk Drive

(*BONA FIDE DEALERS ONLY Please send request for list on letterhead, or just send your business card.)

GAMES PACK

Beat this for value! Five 16K programs Plus two 1K programs

3-D Battle (Micode - 1K)
City Bomb (Micode - 1K)
Warp Wars (Basic & Micode - 16K)
Snake (Basic 16K)
Sweet Tooth (Basic & Micode - 16K)
Slalom (Basic 16K)
Black Holes (Basic 16K)

ALL ON ONE CASSETTE FOR ONLY £4.95 ($9.90)

NEW

GRAPHICS TOOLKIT

(another masterpiece by Paul Holmes)

22 exciting MACHINE CODE routines that give you control over your screen as never before!

(ZX81 - 16K RAM ONLY)

Draw/Undraw draws or deletes your multi-character shape which is defined in a REM statement.

Foreground On/Off use this to 'protect' existing characters on your screen.

Border/Unborder draws a border round the edges of your screen area. Edit lines can be used if required.

Fill fills any number of lines you specify, starting at any line you specify, by your chosen character.

Reverse converts all characters to their inverse video, control as in FILL.

Print Position Controls UP, DOWN, LEFT, RIGHT. Alter your next PRINT position in the direction indicated.

Editprint moves next PRINT position to first edit line.

Scroll Facilities UPSCROLL, DOWNSCROLL, RIGHTSCROLL, LEFTSCROLL. Scroll your screen in the direction indicated.

Onscreen/Offscreen turns your screen on or off.

Background On/Off fills your screen by your specified character.

An ESSENTIAL addition to your 16K RAM ZX81

TOOLKIT

(written by Paul Holmes)

Provides the following additional facilities:-

Line renumber - you state starting number and increment value. GOTO's and GOSUB's included in line renumber.

Search and List - searches for and lists every line containing specified character.

Search and replace - changes every occurance of a character as you require.

Free space - tells you how many free bytes you have left.

Search and Replace will search the screen for every occurrence of the character you specify and replace it with your new character.

Square draws a square or rectangle from your specified co-ordinates.

All these routines are in machine code for SUPER-FAST response! GRAPHICS TOOLKIT uses only 2K of your RAM and that includes space to load the programmers TOOLKIT described above.

ALL FOR ONLY £5.95 ($11.90)

This includes a cassette with 2 copies of the program, 2 copies of a demonstration program plus a comprehensive instruction booklet with examples.

All prices are fully inclusive.

SPECIAL GRAPHICS ROUTINES

Hyper graphics mode - graphics never seen on a ZX81 before.

Fill - fills your screen instantly with your specified character.

Reverse - changes each character on your screen to its inverse video.

TAPE ROUTINE - provides a system WAIT condition until a signal is received in the cassette ear jack.

All these routines are written in machine code and together take up only 1K of your precious RAM - an incredible achievement!!

FOR 16K *ONLY £4.95 ($9.90)*

NEW

BATTLESHIPS & CRUISERS GAME

(16K - ZX81)

First computer version of this popular game of strategy and tactics. Both grids on view together. Establish the position of your fleet then locate and destroy the computer's fleet. Visual display shows hits and misses made and gives running score.

ONLY £4.95 ($9.90)

As reviewed in 'Your Computer' March 1982

16K RAM PACK

ONLY £26.50 ($49.95)

Quite simply the best available plus FREE 'Alien Attack' (7K Micode) on cassette - Value £5.75 ($11.00).

Fully built tested and guaranteed. Uses existing power supply (min 600 m.a.)
Compatible with printer.
No wobble problems.
Gold plated edge connector for perfect contact with your ZX81.
Normally despatched within 10 days of receipt of your order.

With advances in microtechnology we are now able to offer the **64K RAM PACK.** Same quality as the 16K but giving massive memory to your ZX81, with external dimensions no larger than the 16K Ram Pack (above).

ONLY £62.95 ($119.95)

OVERSEAS CUSTOMERS PLEASE NOTE: ALL PRICES ARE APPLICABLE FOR EXPORT, INCLUDING AIRMAIL POSTAGE. PAYMENT MAY BE MADE IN STERLING (MONEY ORDER AVAILABLE AT YOUR BANK) OR YOUR OWN U.S. $ CHEQUE MADE PAYABLE TO *JRS SOFTWARE*. DESPATCH NORMALLY 7 DAYS FROM RECEIPT OF ORDER.

JRS SOFTWARE
19 WAYSIDE AVENUE, WORTHING, SUSSEX. BN13 3JU Telephone: (0903) 65691

ARCADE

LEGGING IT AROUND IN THE GARDEN

CENTIPEDE TIPS

Shoot them right between the feelers, may sound an insensitive command but it makes sense against the insect hordes of Centipede.

This fast moving game is a difficult one to give tips on. It seems best suited to the player with a quick trigger finger, fast reactions and co-ordination.

But there are a few shortcuts to the higher scores. The first is to make sure you hit Centipede heads. As the creature bounces its way down the screen, turning every time it hits a mushroom, a hit on the head segment scores 10 times more than the body segments. And as a new head grows each time you hit the old one, you will never run out of them until the creature is destroyed.

The leaping spider is another way to a high score. The bonus for shooting this creature, depends on when it is hit.

The spider is a real threat in the game as it bounds in at an angle making it difficult to hit. That first bound needs quick reactions to survive if you are in the anachid's path. Beginners should not stray too close to the edge of the screen.

The end of a life bonus system, notches up points for every Centipede segment which you successfully turned into a mushroom — by shooting it.

The bonuses do not accrue if you destroy the mushroom before it has been scored. This is a good case for not engaging in wilful mushroom destruction.

Just shoot out those which are preventing your blaster from moving and, for advanced players, spot the occasions when you can organise a mushroom corridor which will make for easy centipede pickings.

Each time a 'pede hits a mushroom it goes down the screen one level and changes direction. Caught in a corridor of mushrooms the 'pede's head is easily hit.

A scorpion moving across the playfield poisons mushrooms and a 'pede later hitting one of these plummets to the bottom of the screen. Try and hit the scorpion early and limit his poisoning by shooting these mushrooms.

The only way to halt a plummetting 'pede is a direct hit on his head, so stand by underneath and ready for that poisonous touch.

When a non-poisoned segment reaches the bottom other segments come out from the sides to join it. Use your tracker ball to dodge under and shoot them. The continuous fire button gives a new shot each time the previous one makes contact. So a good tactic is to use a low mushroom as an aiming shot and then try to hit the segment as it turns against the mushroom.

The multitude of creatures in Centipede are not always known by their right names. 'Pede is a common abbreviation and the spider is also easily recognised.

But the scorpion has been referred to as an "Angel" and the poor flea has become known as "the Flying Pig".

Tidying up the mushrooms between Centipedes is called: "Doing a bit of gardening" or alternatively "Terrorising the toadstools".

GAME, SET AND MATCH

WORLD TENNIS

Wimbledon without tantrums is on offer to all true grass court fans in the new game World Tennis.

The screen is placed in a "Royal Box" type position looking down on the court from above and behind the player you're backing to take the title.

At the other end of the court is the computer-controlled player.

When the ball comes bouncing over the net, you manoeuvre your champion into position and hit the button to bash the ball back, aiming for a good angle which will set the computer controlled player some problems.

If you manage to beat him with a flashing pass or well-disguised drop volley then you'll score the points. If not, then expect the ball to come back across to you again.

The court is laid out in a 3D perspective and a set of four dropped points by you, constitutes a game to the computer.

The server changes and the game continues until the computer player again manages to get the four points necessary to take a game from you. When you have lost two games, you are thrown out of the tournament.

World Tennis is a simple game with obvious rules and no difficult controls to get to grips with.

As the game progresses, the computer player gradually finds better form and can soon become a real handful... but at least he doesn't shout at the umpires.

Illustration: Terry Rogers

MEET THE RECORD BREAKERS

More high scores flooded in from you arcade kings during the last month.

A lot of people wrote in about Battle Zone, detailing scores which put them well above our previous second place tanker. But Matthew Parnum with over five million stills holds off all-comers at the top spot.

Greg Parsons wrote to point out that many Battle Zone machines will occasionally offer a saucer and missile at the first push of the start button and then comes up with a score well into the millions. So watch out for this bug—sounds like a Screaming Foul-up special.

New high scores have come in for Pacman and Gorf, with 12 people writing in to better John Lee's previous record, but not by much,

Two new games we have included are: Tempest and Dig-Dug. But still no word on Qix or Galaga.

TEMPEST	359,000	Simon Lord
414,716	Daniel Oldham	DONKEY KONG
Richard Holt	PACMAN	369,000
SCRAMBLE	738,980	Paul Dack
867,320	A. Wilson	DIG-DUG
Paul John	FROGGER	591,430
GORF	87,050	Stephen Broadbent
282,860	Danny Blackmoor	BATTLEZONE
J Cameron	MISSILE COMMAND	5,507,000
PHOENIX	12,000,000	Matthew Parnum

WHEN THE KANGAROO GOES APE!

KID KANGAROO

Those pesky monkeys are going to "roo" the day they tangled with my Mom.

Let me introduce myself cobber, I'm Kid Kangaroo and I'm as trussed up as a platypus in a net and blindfolded too — wouldn't you just know it possums.

Even now I'm being held in a treehouse by this gang of apes. I can hear Mom coming to the rescue, but it sure ain't going to be easy for her.

The monkeys are hurling down apples, which she has to dodge. But if it comes to a fist fight, I'd back my Mom against 'em anyday she usually gets the first punch in.

First off she's got to climb a load of rope ladders hung between the branches of the tree. And if she manages that, she must test her special leaping ability by jumping to the top on log steps at different heights.

She's got to be careful though, one false leap will send her tumbling to the jungle floor.

The third stage of her rescue attempt is against a column of monkey kidnappers standing on each other's shoulders, holding the cage (with me in it) at the top. Mom is going to punch them out one-by-one and leap onto higher platforms alongside the cage to attempt her rescue. But her heroics aren't over yet, for Mom has one more challenge . . . she must climb a series of long and short ladders to reach me.

But the real bludger of it all is, that even when she does rescue me and I shout "Mom" at her and somewhere someone plays "Oh Susannah", the monkeys just kidnap me all over again,

And if you thought it all sounded similar to Donkey Kong, well there's a gorilla in our game too. He enters the scene if Mom should hesitate along the way, and tries to nick her boxing gloves.

IT'S A-MAZE-ING!

Well it had to happen didn't it! A pinball based on that loveable denizen of the arcades Pac-Man.

This one comes from Bally and includes features which should keep every pinball wizard happy. Mr and Mrs Pac-Man is an awkward name for a good table — but don't be put off.

It's biggest departure from pinball design is the inclusion of a Pac-Man "maze" feature in the middle of the playfield. This is a five by five square of lights which represents the maze. Once activated the player has to avoid the red "ghost" light and guide his yellow "Pac-Man" light around the maze with the objective of illuminating all 25 lights. Just like the video version you get three lives to play with.

The player wins Pac-Man moves on the maze by hitting targets on the pinball playfield. You activate the maze by slotting your ball into one of two Pac-Man "saucers" on the playfield. Controlling your Pac-Man in the maze is fairly simple once you have mastered the technique. You use the left hand flipper button to indicate direction and the right-hand to move.

By hitting the top drop target bank three times you can turn your normally passive "Pac-Man" into an aggressive little monster who pays no heed to the "ghost". If you've clocked up enough moves while playing regular pinball you will then easily be able to complete a maze.

This colourful addition to the ranks of Bally's tables is sure to prove a winner. Already it's the third top selling table in the States. Look out for it.

AMAZING ANTICS IN AERO-MAZE

LOOPING

Balloons drifting peacefully in the breeze are the villains of the new U.S. chart-topping game, Looping.

The balloons have a tendency to drift into the flightpath of a small aerobatic plane which is controlled by the player.

And it wouldn't be so bad if there wasn't so many of them drifting around the screen.

The temptation is to push the fire button and blast those multi-coloured canopies to shreds and the machine does encourage you to take this course of action — purely in the interests of survival.

While negotiating your way through the balloons over a city, you should watch out for a terminal which has to be blasted away by gunfire to reach the next stage of the game.

This leads through a tunnel to a maze which represents the next challenge.

This is really precision flying and shows how the game got its name, as often, the only way to progress is to indulge in some fancy aerobatics.

Looping and turning through the narrow passages to find your way to the outlet of the maze. The passages resemble a plumber's nightmare of twisting pipes and the area left for manoeuvre often reaches critical proportions.

And the plumbing makes sense when you reach another box with a large tap dripping death down on top of you.

If you survive the tap sequence you can find your path cleared back to tangle with the balloons — only this time the gateway to the tunnel is open and ready to take you through a more difficult maze.

RSONAL CO

LONELY Genie I Microcomputer, early eighties, with large peripheral family but currently unattached, would like to meet interesting, attractively packaged software, Genie or Tandy specification, for programming, problem solving, entertainment and long-lasting friendship. Reply in confidence. Box No RS232.

ANSWERING MACHINES

ingenious ...but lonely!

Buying your first Genie I microcomputer is just the start of a long and enthralling adventure, for it won't be long before you will want to expand your system with some of the wide range of peripherals which make up the complete Genie System.

Firstly there is the **Expansion Box,** which immediately expands your Genie's capacity to 32K RAM, and up to 48K RAM if required. It can be connected to 4 disk drives, a printer, RS232 interface or S100 cards.

Then there is the **Printer,** a compact unit with 80 column, 5 x 7 matrix print-out, which connects to your Genie through the Expander, or via the Parallel Printer Interface.

The **Disk Drive** gives you greater storage capacity and full random access file handling, with the option of double-density through a special adapter.
New Dual Disk Drive now available!

Finally, there is Genie's very own **12" Monitor,** a must if you want to let the rest of the family watch their T.V. in peace!
Available in B & W or green tube.

The supreme advantage of the Genie I system is its compatibility with the TRS 80, which means that literally 1000's of pre-recorded programs are already available, just waiting to be plugged into your Genie!

The recent improvements in the Genie system, including Extended Basic, sound unit and machine language monitor, make it the ideal system for the committed hobbyist, and an excellent and easy-to-use educational tool.

SPECIAL TECHNICAL GENIE HOT – LINE ON 0629 4995
for all your technical advice and service back-up on any aspect of the Genie system direct from the experts!

Please send me FREE, 16 page colour brochure on the Genie Computer System. I enclose 25p postage.

Name _____

Address _____

_____

Telephone _____ CVG•82

LOWE electronics
Chesterfield Road,
Matlock,
Derbyshire DE4 5LE.
Telephone: 0629 4995.
Telex: 377482 Lowlec G.

Graphics

BUYING THE RIGHT MICRO

If graphics is one of your main computing interests, and if you are thinking of buying a micro, then deciding which machine to get can be a rather difficult and complicated matter. The expense involved means that, even if you can persuade someone else to buy it for you, it is important to make the right decision. There are so many microcomputers available now that it is almost essential to know what you want to use yours for, because only if you have definite requirements can you obtain the machine which fulfils them.

Many people want to play games, but to have the benefit of the best graphic displays. Others want to program graphics themselves: the intended uses typically include illustrating and enlivening the user's own games programs, presenting information and exploring computer art. I would say that for anyone with a serious interest in graphics, the ideal choice lies between comparatively few machines. Of course, the cost is a factor, but even when spending £200 or less there is a degree of choice.

The first decision is to pick the style of graphics that you are satisfied with. The choice is between pixel graphics, block graphics and high-resolution line drawing graphics.

Pixel graphics, as provided for example by the Tandy TRS-80, Video Genie and ZX81 are the crudest form of graphics available, although they can be quite effective. However, the resolution that can be obtained is usually rather limited (128 x 58 on the TRS-80), and for this reason lines and curves usually have a visibly "stepped" appearance while shapes have to be represented by rectangular approximations.

With block graphics, which are possessed by the Pet, VIC and Texas TI99/4A, images are composed using character-sized graphics symbols. Quite remarkable images can be designed given sufficient ingenuity.

With the Pet and VIC a fixed repertoire of graphics symbols must be used, but the Texas machine allows the user to design his own graphics characters: for a particular game or application a carefully thought out set of user-defined graphics can make the resultant programming very much simpler.

Systems using block graphics can give what we might call pseudo-high-resolution graphics because by combining graphics characters perfect lines can be drawn, but only in certain directions, and perfect curves can be drawn, but not in the variety that is available with a genuine high-resolution system.

This naturally leads us to consider high-resolution graphics, which has to be the ultimate tool for anyone geunuinely interested in graphics. Most machines with high-resolution graphics provide a resolution of at least 256 × 192 and, in their Basics, drawing commands such as MOVE, for moving the drawing position, and DRAW, for drawing a line.

The highest resolutions available on various machines include 640 × 256 with BBC Model B, 320 × 192 with the Atari 400, 256 × 172 with the Sinclair Spectrum and 176 × 158 on the VIC when a high-resolution graphics cartridge is added to the basic machine.

After deciding on the type of graphics, the decision as to whether you want colour or not needs to be made, but since all well-designed games using colour leave their monochrome competitors way behind, this decision should not take too long.

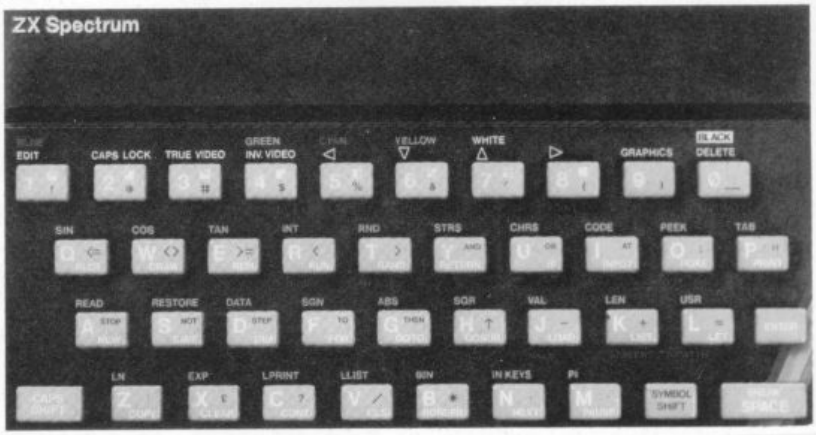
The BBC micro, Atari, Spectrum and VIC are all colour machines, although the number of colours that can be used at their highest resolutions tends to be limited because of the amount of memory that is used. A consideration when producing realistic displays is whether colours can be displayed in various intensities because this allows, for instance, shapes to be modelled in the same way as a painter can model an object in pure colours without using sketching. The Atari provides 16 levels of intensity for each colour and the Spectrum gives 2.

For those more interested in playing games the amount of software available, and its quality, is an important factor. There is a good deal available for the Atari, quite a lot for the VIC and, at present, relatively little for the BBC Micro and the Spectrum, pictured below.

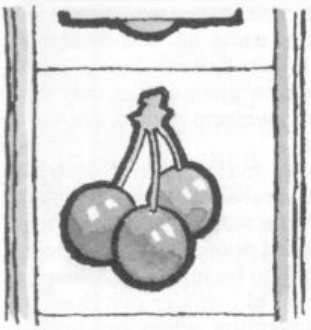
An article discussing the choice of a micro for graphics probably ought to end with a firm recommendation of some sort, and it does seem to me that the Spectrum is a very interesting prospect.

The BBC micro needs no endorsement from me. The VIC is a fine, proven machine, although its future seems a little clouded.

My choice at this stage would be the Atari. The Atari 400 is good value at its new price. The Atari 800 is a much more professional machine but, in my view rather over priced.



BY GARRY MARSHALL



REVAMPED REVIEWS

We have a new broom sweeping through the columns of our Review pages in response to many reader requests for a marking system on which to judge the games we review.

We have come up with three areas which we hope will cover every aspect of games software.

Our review team can expect to have their noses kept to the grindstone for the next few months, marking up tapes in accordance with our new points system.

Each game will receive ratings in three categories. These are defined as "Getting Started": problems loading the tape and a measure of how much help a cassette or disk gives, in making the game easily accessible to the buyer.

"Value" looks at the value-for-money question and takes into account whether the game utilises all the facilities of the machine, presentation and packaging.

"Playability" refers to the enjoyment the game offers, whether it would hold the reviewers' interest or whether it is a good example of the type of game it is based on.

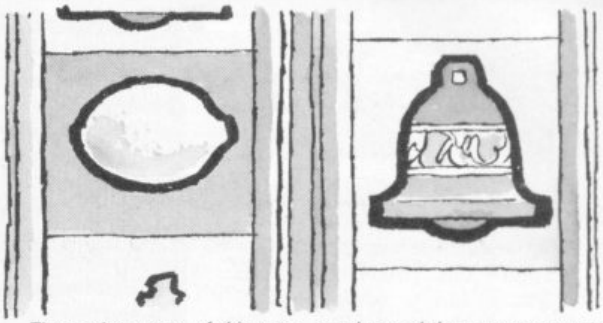
Each mark is made out of a possible 10 and we hope it will provide an accurate guide.

We will also be looking at a particular game for a particular machine from time-to-time, say Pacman for the VIC-20. We will give a thorough rundown of every possible version and compare these for a best buy.

Our hope is that the Reviews section of the magazine will be of more use to purchasers.

Illustrations: Jon Davis

NOT QUITE SIX OF THE BEST FOR VIC



VIC 6

Quantity rather than quality seems to be the order of the day at Beelines manufacturers of the Vic 6 series of games. Their latest offering features Fruit Machine, Brickdown, Blockade, Roulette, Hangman, and Tarkus — only three of which — Roulette, Hangman and Blockade — worked properly.

Fruit Machine was the biggest disappointment for me — a keen bar room 10 pence pusher — as the game loaded successfully, appeared on the screen, but would then not obey the instruction to start. This became a familiar pattern as I progressed to Brickdown and then Tarkus.

Brickdown did actually start — it is a breakout type game — though the bat could not be made to move up and down, the offending keys being the same as with Fruit Machine "F" 5 and 7.

Blockade did run — not that it mattered — as it is a graphically poor and deathly slow version of Space Invaders.

Beelines explain the problem with key F7 as being due to a bug built into the operating system of the VIC-20. They also point out that the Fruit Machine game is not written for the unexpanded VIC requiring a 3K cartridge.

The saving grace of this tape were two excellent games on side B — Roulette and Hangman. Hangman I particularly enjoyed — the graphics are good the little man appearing arm-by-arm and leg-by-leg, so much better than the stick men of the pen and paper version that we all used to play at school.

The game also gives you a running list at the top of the screen of the letters you have already tried. If you are hung the game commiserates and asks you if you would like to try again. This is a simple yet absorbing game and would be an ideal way for children to improve their spelling and learn to use the VIC-20.

Roulette brings the excitement of the casino to your living room. The game gives you £5,000 to start, you choose your lucky number and then press space to start.

Unfortunately the game does not display a wheel but a digital number display.

This does not detract too much from the game though as the numbers do start off fast and then slow down, sometimes causing you to celebrate too early when you think your number is up with your last £100 on the table, just as in a real game of Roulette.

Two good games did not really compensate for the frustration of four games that would not start, or would not work properly if they did.

VIC 6 is available from Bolton-based Beelines at £9.95 including postage and packing.

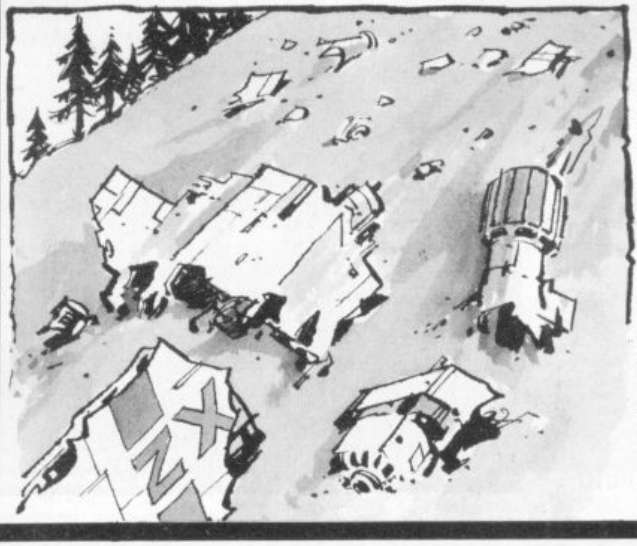
- **Getting started 2.**
- **Value 2.**
- **Playability 7.**

WHO NEEDS GRAPHICS!

SCRAMBLE

This version of Scramble proves that you don't need sophisticated graphics to produce an enjoyable arcade game replica.

The missiles here are capital "A"s fired up in a looping flight from the hillsides and valleys. The alien planes are made up of "less than" signs arrowing their way through the skies and the fuel tanks are grey smudges dotted along the landscape.



But for sheer compulsion it is going to be hard to beat this game. You play the part of a aircraft armed with bombs and guns, on a mission over enemy territory.

The screen scrolls from left to right, forcing you forwards but allowing you to alter altitude above the crags and chasms of the landscape.

Fuel tanks and missiles can be blown up to score points, either by dropping to their level and firing out ahead of you, or by sending looping bombs over the hills to drop down on them.

The missiles periodically take-off and it is advisable to try and

destroy them before you have to pass over them or retreat to the top of the screen where they are less likely to surprise you.

But the greatest danger is posed by the enemy airborne fleet which descends from the heavens in groups of up to four, spitting fire and rising and falling in flight as they search for you.

The tactics are pretty obvious but the race to beat a friend's high score is thrilling. It has all the addictive ingredients of being a game simple enough to make you believe you can always do better, so you never finish satisfied with your performance.

Quicksilva have already won themselves a good reputation for producing good arcade replicas within the limitations of the ZX81, this cassette will further that reputation.

It costs £4.95 from Southampton-based QS and runs on a ZX81 with 16K Rampack.

- **Getting started 9.**
- **Value 8.**
- **Playability 8.**

FIGHTING THE GOOD FIGHT ON THE ZX81

CONFLICT

War — its cost in hard cash as well as in the cost of ships, planes, tanks and the incalculable cost of the lives lost — are the principle ingredients of Conflict — a new computer-cum-board game.

The aim of the game is to fight off your opponent and conquer his territory.

Each player is given a sum of money which he can use to drill for oil or speculate on the stock exchange in order to finance his war effort.

There are also a number of neutral merchant vessels whose cargoes of gold, silver, copper and iron can be captured and added to your fighting fund.

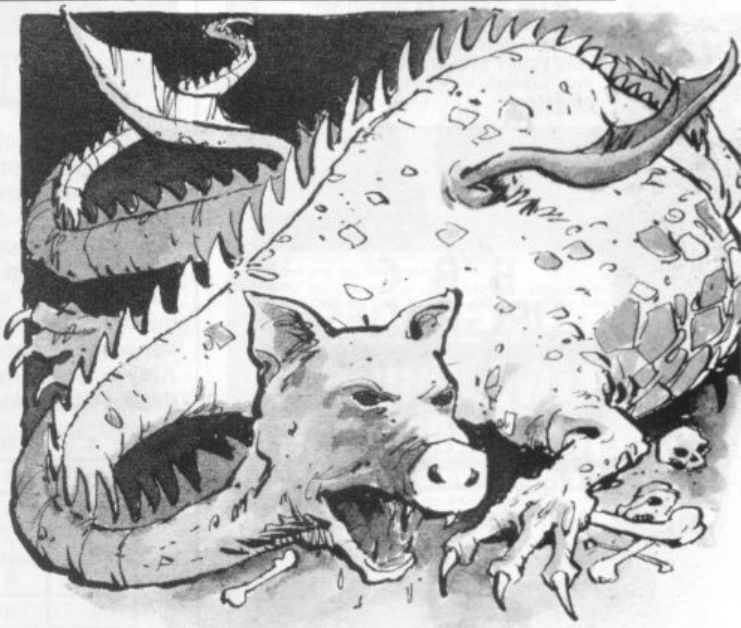
Once the armed forces of both sides have been assembled the battle can commence. It is a protracted war of attrition in which you must keep a keen eye on your opponent's positions and the relative balance of ammunition and supplies

The computer keeps tally of your cash, stocks, shares and missiles but it does not provide a display of the board.

I enjoy this strategy game as it made me think, rather than letting the computer do all the work, as so many other new computer games do.

Conflict is available from Martech Games at £9.50 — which includes the cassette, board, counters, markers and 40 disposable maps. The game runs on a ZX81 in 16K with versions for the Video-Genie and Pet in the pipeline.

- **Getting started 9.**
- **Value 7.**
- **Playability 7.**



BEWARE THE BOUNCING DRAGON!

BORG

You are trapped in a castle full of dragons, on a mission to seek out and destroy the evil Grud.

Grud is a tyrant who rules the Grudonian countryside with an iron fist. He is a cunning adversary — marshalling his army of dragons from well behind the battle lines, staying out of the fray until the very end when only the cleverest of opponents will have survived 10 rooms full of hazards to do battle in Grudgeon — Grud's Lair.

Grud's chief ally is Borg who he will call up to the battle when the dragons seem to be losing the fight.

You can hear Grud calling Borg although you cannot see him. This is a most amusing aspect of the game — tone Grud calls Borg as if he were calling his pet poodle.

Unfortunately Borg is no pet poodle — but a fierce dragon — larger than the other dragons and more deadly.

Borg bounces across the screen killing anything he comes into contact with. As you cannot shoot Borg — his appearance is the signal to make a dash for the next room.

The 10 rooms you must negotiate will test your senses to the full. The Rohrschach Room is a test of your powers of observation, Huevos Grande is the kitchen — guess who is on the menu — the Bear Trap Room will trap you as well as any bears who happen to be in the vicinity. There is also the Trash Compactor Room — which I did not get to, but which is engagingly described in the instructions as being named in honour of Grud's favourite author — Grudgar Allan Poe.

I found Borg an enjoyable, even compulsive, game though I was not sure — even as I pressed the space bar for what must have been a 100th time, whether I was doing so out of real enjoyment, or out of sheer frustration at being unable to get further than the second room.

You cannot imagine the frustration of hearing Grud shouting for Borg — but then not being able to see him!

It is very difficult to manoeuvre your little man as most of the time he will only move forward in diagonals — but then suddenly, and for no apparent reason, he will move forward or backwards horizontally.

Borg is not really a keyboard game and I think it would have been better if the instructions had recommended a joystick more definitely.

You will also require a colour screen to become really adept at Borg as many of the hazards can only be identified by colour.

Borg is a good game based on the Berserk principle. It is produced by Sirius Software and runs on disk for the Apple II, available from London based Software House at £19.55.

- **Getting started 7.**
- **Value 5.**
- **Playability 8.**

SUPERMARKET

SPECTRUM ZX81
GAMES GALORE
AT THE FOURTH ZX MICROFAIR
SATURDAY, 21st AUGUST, 1982
NEW HORTICULTURAL HALL
GREYCOAT STREET, LONDON SW1
plus hardware, books and user groups.
Organiser: Mike Johnston, 71 Park Lane, London N17 0HG.
Admission 60p (40p under 14s)

B B C
UPGRADES
LOW PRICES
16K RAM <£30
Dealers Welcome
Avon Computer Rentals
FREEPOST 18 THORNBURY BRISTOL BS12 1BR
TELEPHONE (0454) 415460

★ ATARI 400/800 SOFTWARE ★
LARGE RANGE NOW AVAILABLE INCLUDING:
Preppie (16K/D) £19.95
Alien Swarm (16K/D) £20.50
Ali Baba (32KD) £20.95
Temple of Asphai (32K/D) £26.95
Frogger (16K/D) £21.95
Protector (32K/D) £19.95
+ SPECIAL OFFERS + DISCOUNTS
For details send stamp to:
CREATIVE SOFTWARE
48 Hartlip Hill, Newington,
Sittingbourne, Kent ME9 7NZ.

ADULT ONLY
VIDEO CLUB!
Ring: 0373:
day or evenings (cheap rate)
830563
or send coupon to:
VIDEO CLUB
1, DREWSTEAD RD.,
LONDON S.W.16
Please send FREE details, I am over 18
NAME .....
ADDRESS .....
.....
PHONE .....
Please remember to fill in your telephone number

Brainware

MIND ROUTINES

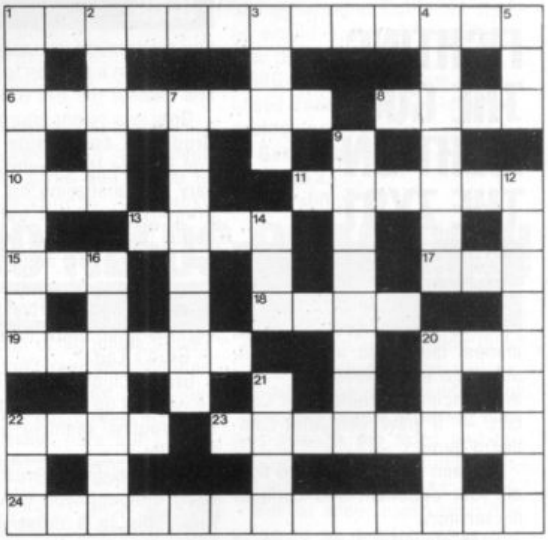
The standard set of 28 dominoes are set out to form a 7×8 grid of numbers as shown. Can you reconstruct the dominoes (i.e. link the numbers together in pairs) so that each one of the 28 appears once and once only. For example the double one domino can appear in either of two places — ABO or DMN. Note that the double-blank domino could appear in any of 10 positions.

Winners of our July issue Brainware problems were: P. M. Hynes, 75 Thorpes Avenue, Denby Dale, Nr. Huddersfield, Yorkshire and Mr Alan Northcott, 'Rushmoor', 464 Reading Road, Winnersh, Wokingham, Berkshire RG11 5ET. Bottles of champagne are on their way to both.

Two more bottles can be won for the first people out of the hat with this month's answers correct. Answers to the August problems are on page 12.

A	B	C	D	E	F	G	H	
6	5	3	3	1	2	4	2	I
6	5	5	3	4	6	5	1	J
3	1	0	0	0	0	2	3	K
3	6	0	0	0	0	4	3	L
1	6	5	1	3	2	2	2	M
6	6	4	1	5	2	5	2	N
1	1	4	2	6	4	5	4	O

NEVERA CROSSWORD



ACROSS

1. Great M.Sc Event Circulated for Intellivision, Atari etc. (2, 5, 6)
6. Satellite's at a high temperature for video game (8)
8. Computer and Video Game's publisher. Some of us saw them appear! (4)
10. Collection verb assigning value to COBOL index (3)
11. Part of 10 — an underwater collection? (6)
13. Shilling tin search (4)
15. Ancient Basic command (3)
17. Pass on a random number generator (3)
18. On which the Spectrum's output is displayed underground (4)
19. New game groove grooved! (3, 3)
20. RAIR terminator on the radio (3)
22. Nothing in the ROM kitchen for example (4)
23. Video game sacked the Mona Lisa (8)
24. If I can't cope is confused instructions for a programmer (13)

DOWN

1. Adventure game - or a collection of bits from a leading newspaper (9)
2. Force party giver prominent in Haunted House game (5)
3. In which assorted lots of coins are placed in the arcade game (4)
4. Paper boss — or it's educational counterpart (5, 2)
5. Abbreviated computing from timed prints (3)
7. Rainbow machine (8)
9. Blue safe turnabout wherein to recharge your rockets (4, 4)
12. Micro or part of an ATOM (3, 6)
14. Duck in No Trump negation (3)
16. Alsation left as losing Gunfight player might utter (7)
20. A king I found on a junction supplies micros and video games (5)
21. Computer skirt (4)
22. Small resolution found in space rocket (3)

SOFTWARE GLOSSARY

A beginner's guide to plain jargon

ACTION GAME: A game to test the speed of your reflexes — Space Invaders for example.

ALGORITHM: A process or set of rules to carry out a task or solve a mathematical problem.

ARRAY: A series of items arranged to form a meaningful pattern.

BASIC: The most widespread computer language which is one of the easiest to learn and is used for programming all microcomputers.

BUG: A slang term given to a mistake in a computer program which prevents it from working. It can refer to a mechanical, electrical, or electronic fault.

BUS: The circuit over which data or power is transmitted.

BYTE: A term to measure a number of Bits (BInary digiTS), usually there are eight bits to a byte.

COLOR: American spelling used to call colour out of several U.S. computers, e.g. the Apple.

CURSOR: A position indicator used by most computers to show where the next character should be entered.

DROP TARGETS: Targets on a pintable which retract upon being hit by the ball.

GET: A Basic command which tells the computer to scan the keyboard and return with either a numeric or string value.

GRAPHICS MODE: A mode in which the computer can produce graphical characters and displays.

HARDWARE: The general term given to all pieces of electronic and mechanical devices which make up a computer system, i.e. the actual machines.

INKEY$: A Basic command which checks the keyboard for input and places it in a string.

INPUT: Data or information which is fed into the computer.

INTEGER: A number which does not contain a decimal point, i.e. a whole number.

K: See kilobyte.

KILOBYTE: A measurement of memory capacity. 1K is equal to 1024 so 8K is equivalent to 8192 bytes.

L.E.D.: (Light Emitting Diode) Provides a simple display and consists of an electron tube which lights up when electricity is passed through it.

LOAD: Instruction which is used in conjunction with a cassette recorder to transfer programs from tape to the computer's memory.

MATRIX: A rectangular array of numbers subject to mathematical operations.

PERIPHERALS: Equipment which is used with a computer system, e.g. printers, disc drives, and VDUs.

PRIORITY INTERRUPT CONTROLLER: Facilitates high-speed Interrupt processing.

PROGRAMMABLE TIMER CONTROLLER: A chip which counts time independently of the microprocessor.

PLOT: To map or draw points on the screen.

RAM: (RANDOM ACCESS MEMORY) This is a memory chip which you can load programs and data to and from.

RAMPACK: A cigarette-case sized pack of extra R.A.M. which plugs onto the back of a Sinclair ZX81.

RUN: Basic command word tells the computer to perform the numbered sequence of actions referred to as a program.

SOFTWARE: Another name for computer programs.

STARTREK: A popular computer game based on the TV series of the same name, in which the player takes command of the Starship Enterprise and roams the galaxy, destroying Klingons and investigating solar systems.

STATEMENT: An instruction in a computer program.

STRATEGY GAME: A game in which you must carefully plan your moves taking into consideration the likely counter moves of your opponent.

STRING: Usually represented by a $ sign on the computer keyboard, a string is a connected sequence of characters or words, usually placed within PRINT statements.

SYNTACTIC ERRORS: Typographical mistakes in program lines. Information put in the wrong order, information which conflicts with other information or program lines which refer to other unentered lines.

UART — UNIVERSAL ASYCHRONOUS RECEIVER-TRANSMITTER: Device for interfacing word parallel controllers or data terminals to bit serial communications networks.

ZX 81 (16k)
EDUCATIONAL SOFTWARE

"O" LEVEL FRENCH REVISION — 3 teach and test grammar programs plus 3 vocabulary programs.
"O" LEVEL MATHS REVISION — 1 teach and test program plus 2 programs of timed tests using generated questions from "O" level syllabus.
JUNIOR MATHS 1 — Long Multiplication, Long Division, Highest Common Factor, Lowest Common Multiple, Fractions 1 (+ & −), Fractions 2 (X & ÷).
JUNIOR MATHS 2 — Areas, Perimeters, Simple Equations, Percentages, Sets, Venn Diagrams.
JUNIOR ENGLISH 1 — Meanings 1, Meanings 2, Parts of Speech, Proverbs, Similes, Anagrams.
JUNIOR ENGLISH 2 — Idioms, Opposites 1, Opposites 2, Group Terms, Odd Word Out, Spellings.
ARITHMETIC FOR THE UNDER 8's — Add, Subtract, Multiply, Divide. Allows for the entry of units first.
EDUCATIONAL QUIZ — 4 programs on General Knowledge, Reasoning, English and Maths. All questions use RND function.

£4.50 per cassette or send SAE for catalogue to: ***ROSE CASSETTES,*** *148 Widney Lane, Solihull, West Midlands B91 3LH.*

VIC 20 SOFTWARE

10 PROGRAMS ON ONE CASSETTE £7.50 Inc. — Asteroids, Connect Four, Maths, Simon, Breakout, Grand Prix, Hangman, Brickstop, Blotch, Piano.
ALSO: Space Invaders £4.50, Gomoku (Ram) £3.50, Horse Race (Ram) £3.50, Boxs (Ram) £3.50, Maze (Ram) £3.50. OR ALL programs with Ram for £9.50.
AND: GAMES CARTRIDGES. Each for £22.50 + Space Invaders and Asteroids (free). Choice includes ALIEN, STAR BATTLE, AVENGER, ROAD RACE, SUPER SLOT, SUPER LANDER.
Please send cheques/P.O.'s or SAE for details plus 50p P&P to: **WONG'S SOFTWARE, 119 Runcorn Road, Barnton, Nr Northwich, CW8 4EX.**

TRS80 & VIDEO GENIE

A host of Software — Games & Utilities, Basic & Machine Code — Something for everyone at uninflated prices — Any six programmes only £7.50. Send 12½p stamp for full lists.
J.T. WILSON, 9 COTSWOLD TERRACE, CHIPPING NORTON, OXON. TEL: 0608-3059 (9a.m.-8p.m. Mon.-Sat.)

"...the quality of the colour display is excellent". Popular Computing Weekly.
"The graphics facilities are great fun". Personal Computer World.
"...the Spectrum is way ahead of its competitors". Your Computer.

"The world's best personal computer for under £500."

Chris Sinclair

Sinclair ZX Spectrum
16K RAM £125, 48K RAM £175.

This is the astonishing new ZX Spectrum – a powerful professional's computer in everything but price!

There are two versions – 16K or a really powerful 48K. Both have a full 8 colours, sound generation, a full-size moving-key keyboard and high-resolution graphics. Plus established Sinclair features such as 'one-touch' keyword entry, syntax check and report codes!

Key features of the Sinclair ZX Spectrum

Full colour – 8 colours plus flashing and brightness-intensity control.

Sound – BEEP command with variable pitch and duration.

Massive RAM – 16K or 48K.

Full-size moving-key keyboard – all keys at normal typewriter pitch, with repeat facility on each key.

High resolution – 256 dots horizontally x 192 vertically, each individually addressable for true high-resolution graphics.

ASCII character set – with upper- and lower-case characters.

High speed LOAD & SAVE – 16K in 100 seconds via cassette, with VERIFY and MERGE for programs and separate data files.

The ZX Printer – available now

The printer offers ZX Spectrum owners the full ASCII character set – including lower-case characters and high-resolution graphics.

Printing speed is 50 characters per second, with 32 characters per line and 9 lines per vertical inch.

ZX Microdrive – coming soon

Each Microdrive will hold up to 100K bytes on a single interchangeable microfloppy – with a transfer rate of 16K bytes per second. And you'll be able to connect up to 8 ZX Microdrives to your ZX Spectrum – they're available later this year, for around £50.

How to order your ZX Spectrum

BY PHONE – Access, Barclaycard or Trustcard holders can call 01-200 0200 for personal attention 24 hours a day, every day.

BY FREEPOST – use the coupon below. You can pay by cheque, postal order, Access, Barclaycard or Trustcard.

EITHER WAY – please allow up to 28 days for delivery. And there's a 14-day money-back option, of course. We want you to be satisfied beyond doubt – and we have no doubt that you will be.

sinclair
ZX Spectrum

Sinclair Research Ltd,
Stanhope Road, Camberley, Surrey, GU15 3PS. Tel: Camberley (0276) 685311.

To: Sinclair Research, FREEPOST, Camberley, Surrey, GU15 3BR. **Order**

Qty	Item	Code	Item price £	Total £
	Sinclair ZX Spectrum – 16K RAM version	100	125.00	
	Sinclair ZX Spectrum – 48K RAM version	101	175.00	
	Sinclair ZX Printer	27	59.95	
	Printer paper (pack of 5 rolls)	16	11.95	
	Postage and packing: orders under £100	28	2.95	
	orders over £100	29	4.95	
			TOTAL £	

Please tick if you require a VAT receipt ☐

*I enclose a cheque/postal order payable to Sinclair Research Ltd for £_____

*Please charge to my Access/Barclaycard/Trustcard account no. Please print.

*Please delete/complete as applicable.

Mr/Mrs/Miss

Address

FREEPOST – no stamp needed. Prices apply to UK only. Export prices on application. CVG 809

ZX Spectrum
20 Programs £6.95

The ZX Spectrum has brought advanced computing power into your home, The Cambridge Colour Collection, a book of 20 programs, is all you need to make it come alive.

No experience required. Simply enter the programs from the book or load them from tape (£2.95 extra) and run.

Amazing effects. All programs are fully animated using hi-res graphics, colour and sound wherever possible.

Entirely original. None of these programs has ever been published before.

Proven Quality. The author already has 30,000 satisfied purchasers of his book of ZX81 programs.

Hours of entertainment

- **Lunar Landing.** Control the angle of descent and jet thrust to steer the lunar module to a safe landing on the moon's surface.
- **Maze.** Find your way out from the centre of a random maze.
- **Android Nim.** Play the Spectrum at the ancient game of Nim using creatures from outer-space.
- **Biorhythms.** Plot the cycles of your Emotional, Intellectual and Physical activity. Some would say this is not a game at all.

Improve your mind

- **Morse.** A complete morse-code training kit. This program will take a complete beginner to R.A.E. proficiency.
- **Maths.** Adjustable to various levels, this program is an invaluable aid to anyone trying to improve their arithmetic.

Run your life more efficiently

- **Home Accounts.** Keeping track of your finances with this easy-to-use program will enable you to see at a glance where the money goes and plan your spending more effectively.
- **Telephone Address Pad.** Instant access to many pages of information.
- **Calendar.** Displays a 3 month calendar past or future, ideal for planning or tracing past events.

ORDER FORM:

Send Cheque or P.O. with order to:–
Dept. E., Richard Francis Altwasser, 22 Foxhollow, Bar Hill, Cambridge CB3 8EP

Please send me

☐ Copies Cambridge Colour Collection Book only £6.95 each.
☐ Copies Cambridge Colour Collection Book & Cassette £9.90 each

Name: _____

Address: _____

_____

COMPUTER WORLD

SOFTWARE
for
VIC 20 ZX81 BBC

VIC 20 SOFTWARE
Demolition; Red Arrows; Targets; Hangman; Maze; Guess a Number.

GREAT OFFER! PICK ANY THREE GAMES FOR ONLY £3.95.

GRAND PRIX AND NUCLEAR ATTACK. 2 PROGRAMS FOR THE PRICE OF ONE. ONLY £4.95.

VIC 20 MINEFIELD AT £5.25

ALL PROGRAMS RUN ON THE BASIC VIC 20

BBC
MICROCOMPUTER OWNERS AN ADVENTURE GAME FOR THE 16K MACHINE.
DUNGEONS AND DRAGONS £7.25

ZX81 GAMES FOR THE 1K MACHINE

SPECIAL OFFER! ANY 3 GAMES CAN BE SELECTED FOR ONLY £3.95 FLYING SAUCER, CHOPPER, THE BLOB, SPACE BOULDERS, THE RACE, COMPUTASKETCH.

ALSO FOR THE ZX81 16K MACHINE

Football Manager	@ £7.95	Murgatroyds	@ £5.95
Space Invaders/ Space Rescue	@ £6.95	Star Trek + 3D O's & X's	@ £6.95
ZX-81 Chess	@ £6.90	Breakout	@ £5.95
3D Monster Maze	@ £5.95	Space Intruders	@ £5.95

All prices include VAT & P+P.

Rom & Cassette Software available for Sharp MZ80A & K, Texas TI99/4, Video Genie, Acorn Atom, Atari 400. Send SAE for free list.

BEC COMPUTERWORLD
Dept. 2.
66 LIME STREET,
LIVERPOOL L1 1JN. Tel: 051 708 7100

Following the success of our ZX81 plinth we have introduced a workstation for the Spectrum. This stylish ABS plinth raises and tilts the TV for better viewing whilst angling the Spectrum and making typing easier. The PSU is hidden underneath, the printer and cassette may still be used, and a matching, stackable unit for Microdrives will be available.

Peter Furlong Products, Unit 5, South Coast Road Industrial Estate, Peacehaven, Sussex BN9 8NA. Tel. (07914) 81637.

STARWEB

Computer moderated play by mail game. As featured in this issue. Rules only £1.00. **From: I.C.B.M., P.O. Box 94, Bath Street, Walsall, W. Midlands.** Also available, brand new p.b.m. game, Universe II. £1.00 rules only.

HAVE YOU EVER WON A
"CONFLICT"
THE EXCITING NEW **COMPUTER BOARD GAME** FOR TWO PLAYERS.
Includes cassette tape (ZX81 16k), full size board, pieces, instruction booklet for only £9.50 (inc. P&P).
Who would YOU challenge?
Cheque or P.O. to:
MARTECH GAMES, 9 Dillingburgh Road, Eastbourne, East Sussex BN20 8LY.

THE U.K. GAMES LIBRARY

FOR COMPUTER GAMES, TAPES DISCS AND CARTRIDGES.

ZX 81 VIC 20 APPLE ATARI

£40 per annum allows you to borrow up to 50 games of your choice from 100's available.
****
Send now for free catalogue.
Please enclose details of your machine.

GAMES GALORE, PO BOX 330
SLOUGH, SL1 2LZ.

VIC-20 SOFTWARE

HOUSE OF HORROR: In the derelict house are hidden untold treasures for those bold enough to enter. With only one box of matches to light the way, can you find and steal the treasure from the unspeakable horrors that protect it? Ghosts, bats, floating skulls and zombies await you with certain death if you are still inside when the clock strikes midnight. Not recommended for those of nervous disposition. Price £5.99 from

BYTEWISE
8 Valentine Avenue, Sholing, Southampton SO2 8CR.

BUFFER MICRO SHOP
(NEXT TO STREATHAM STATION)

RETAIL CENTRE FOR
✳ **SINCLAIR COMPUTERS** ✳
SOFTWARE, GAMES,
RAM-PACKS, KEYBOARDS

Items from most leading mail order suppliers — games, serious, business and technical progs — available over the counter, sae appreciated for catalogue.

★ ★ ★

374A STREATHAM HIGH ROAD, LONDON SW16

TEL. 01-769 2887

HARDCORE

A GAMES PLAYER'S GUIDE TO THE SHARP MZ-80K

THE ALL-IN MICRO

The MZ-80K was launched in this country in 1979 — the first Japanese microcomputer to be sold in the U.K.

The basic package is an "all-in-one" unit, with a screen, tape deck, and computer console built into one unit. So you do not have a spaghetti junction of leads worming their way around the living room. The MZ-80K has just one lead which plugs into a normal mains supply.

The MZ-80K comes with a comprehensive instruction manual which teaches you Basic through a series of examples and exercises.

Sharp Basic has to be loaded into the machine from cassette tape which is supplied with machine. Loading Basic requires 16K of memory, leaving only 4K of memory for user programs if you purchase the standard 20K version. However, most of the MZ-80K's sold were the 48K version of the machine which have 32K of memory for user programs after Basic has been loaded.

The tape deck comes complete with a tape counter which is useful for locating programs, and is reasonably fast capable of 1200 B.P.S.

The black and white screen is 10" wide and has 25 lines of 40 characters per line.

The MZ-80K also has a built-in loudspeaker to make use of the music and sound facilities which enhance the wide range of games software that are available.

Sharp UK sold out of the MZ-80K in April as consignments of its new re-vamped machine the MZ-80A began to fill its warehouses. The K is still available from most Sharp dealers although the price varies a lot, having fallen sharply since the MZ-80A has been announced.

EASY TO EXPAND

The MZ-80K has a wide range of equipment available which enables you to expand the computer as your knowledge and requirements grow.

The MZ-80 I/O, interface unit connects the central processor unit, the Z80 within the MZ-80K, to other peripherals such as dual standard 5¼" floppy disks. The MZ-80 gives a real memory expansion — but you'll need to have the odd £600 handy at current prices.

There are two printers available for the MZ-80K. The MZ-0P3 is a tractor feed printer — which stops the paper from slipping, and can print all of the computer's 226 characters at a speed of 96 characters-per-second. The MZ-80P3 is currently selling at £395.

The Epsom MX-80F/T is also a tractor feed printer but unlike the MZ-80P3 it is capable of printing high resolution graphics. Sharp graphics chips convert the Epsom MX-80 printer to give full Sharp graphics and a wide range of other features. The package is complete with its own Basic tape to give the extra commands required to utilise the wide range of extra functions.

High Resolution Graphics operate in ESC K and ESC L modes — ESC K producing 480 dots per line, and ESC L giving 960 dots per line. The Epsom is available from Sharp dealers at £350.

The Quantum Hi-Res Graphics System works off two static RAM chips and includes four self-executing programs — all of which run in Sharp Basic.

These include a graphics editor to facilitate the simple programming of special characters: HEX, PLOT, and JOIN enable you to create your own graphics. It also has a demonstration on high resolution plotting, and an extension of plot routines. Quantum Hi-Res Graphics System is available from most dealers at £115.

BASIC SHARP

Sharp Basic is supplied with the machine on a cassette. You load it into the machine, leave for about a minute and a half and the machine will then tell you that it is ready for user programs. Sharp Basic is very similar to Microsoft — the standard language of most microcomputers.

For the more adventurous programmer there is an advanced language called Forth which enables the user to impliment his own ideas, within the structure of the language. A new version of Forth has just been introduced by Kuma Computers at £34.95 including a 32 page instruction manual. Sharpsoft and Knights TV and Computers also sell a Forth package.

There are two educational languages available for the Sharp MZ-80K Cesil 3 and Pilot both of which are available from Sharp dealers.

There are also a number of business languages available for the MZ-80K but these will require a hardware modification to take CP/M software.

THE GAMES PEOPLE PLAY

Games playing on the MZ-80K has been improved by the development of a joystick by Microspec of Kilsyth. It costs £34.00 and includes an instruction cassette and three free games. The joystick plugs straight into the back of the MZ-80K and does not require I.O. Board. It runs on 6-9 volts requiring a power supply unit which is also available from Microspec at £4.50.

HARDCORE

A GAMES PLAYER'S GUIDE TO THE SHARP MZ-80K

SLEEK MACHINE

Sharp's new machine — the MZ-80A is a 48K "all-in-one" computer on the same sleek lines as the MZ-80K.

It is housed in a rigid plastic mounting — unlike the K, which is housed in a metal cabinet.

The new machine has been given an improved keyboard which facilitates touch typing — something it is not easy to do on the MZ-80K, and has a slightly larger screen — with a green character display.

Sharp Basic for the A is supplied on cassette with the machine and is almost indentical to Basic for the K, which in turn is very close to Microsoft. This similarity in Basic is a definite plus to the potential MZ-80A buyer as it means that all the software that is now available for the K can be very quickly converted by the software houses to suit the A.

The MZ-80 is considerably more expensive than the K — in the shops at a price of £549 (inc VAT). The price difference is thought by Sharp dealers to take the machine out of the home hobbyists market into the lower end of the business market.

Expansion of the A is achieved similarly to the K. The basic Expansion unit costs £100. Disk drives (inc. Interface) are available at £400 for the single and £590 for the twin. As with the K there are two printers available for the A — Tractor feed at £349 and Friction/Tractor feed at £409. The interface costs £30, Cable £23, and character generator £13. All the above prices are exclusive of VAT.

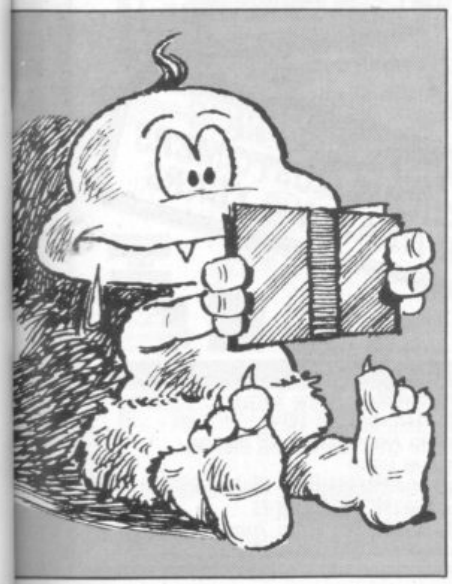
THE BIG THREE

Sharp publish a regular MZ-80K Software Catalogue which includes a comprehensive list of all the games, business, and educational software that is available for the machine. The catalogue is available from Sharp Electronics (UK), Sharp House, Thorp Road, Newton Heath, Manchester M10 9BE.

The big three games software manufacturers for the MZ-80K are: Kuma Computers of 11 York Road, Maidenhead, Berks. SL6 15Q; Sharpsoft 86-90 Paul Street, London EC2A 4NE; and Knights TV Computers, 108 Rosemount Place, Aberdeen.

Between them these companies can provide just about every type of computer game and a few more — from Pacman to Space Invaders there is a wide variety of games available for this machine. It has to be said, however, that the MZ-80K was designed with businessesather than games in mind. And you will need to purchase a joystick to enjoy games like Pacman, and Scramble to the full.

Other companies supplying games software for the MZ-80K are: Microspec, 143 Balmalloch Road, Kilsyth G65 9PH; Prorole Ltd, 642 London Road, Westcliff-on-Sea, Essex; Highlight Software, 3 Nether Court, Halstead, Essex; Premier Publications, 12 Kingscote Road, Addiscombe, Croydon.



WRITTEN WORDS

There is a growing library of published material available in English for the MZ-80K.

The *Beginner's Guide to the Sharp MZ-80K* by R. G. Meadows is published by Sharpsoft at £3.95 and can be obtained from their offices in London.

Peeking and Poking the MZ-80K by G. P. Ridley is available from most good bookshops at £4.30.

Software Secrets by G. Beech is also available from good bookshops and Sharp dealers at £5.95.

Software Techniques by Trowsdale is a new title on the MZ-80K available from most good bookshops and Sharp dealers at £5.95.

Sharpsoft also publish a series of User Notes for the MZ-80K covering a wide area of user interests. The notes are published three times a year and the 1982 subscription is £7.50 for the U.K.

SUPERMARKET

MICROWARE

131, Melton Road,
LEICESTER
Tel: 0533 681812

Retailing hardware, software, books and periodicals for Sinclair Computers. **AND NOW BBC MICRO** and **VIC 20** software and books. **ALSO**, our own **SPECTRUM SOFTWARE,** "Alien Command", testing Invaders Star game. £5.50. Shop or mail order.

HAVE YOU SEEN MR MICRO'S CATALOGUE? IT CONTAINS OVER 50 PROGRAMS FOR THE VIC 20. For your copy send a 9 × 4 SAE to **MR MICRO LTD**, PO Box 24, SWINTON MANCHESTER M27 3AL.

ATARI OWNERS

We stock the latest, most exciting games and simulation software for the ATARI 400 & 800. At extremely low cost!
Send today for free brochure to:
THE 48 CLUB — 29 RIDDLESDOWN RD., PURLEY, SURREY.

AT LAST! PUCKMAN
FOR THE ZX81 (16K)

YOU CAN NOW PLAY THIS EXCITING ARCADE GAME ON YOUR ZX81.
★ WRITTEN ENTIRELY IN M/C
★ SUPER FAST ACTION
★ ALL THE FEATURES OF THE ORIGINAL
ONLY £4.95 INLCUDING VAT + POSTAGE.
CHEQUE/P.O. TO:
P.S.S., 112 Oliver Street,
Coventry, CV6 5FE.

VIC OWNERS NEED "TERMINAL SOFTWARE"

LINE UP FOUR
(Reviewed in 'Your Computer' — "Brilliant") **£4.95**
ALSO
MAZE MUNCHER REVERSI £4.95
SCRAMBLE £5.95
All games include P&P.
TERMINAL SOFTWARE
19 Canberra Road,
Bramhall, Cheshire, SK7 1LG.

BEFORE YOU BUY YOUR MICRO!

COMPUTER, PRINTER, DISC DRIVES & ACCESSORIES

ALMOST EVERY MAKE OF POPULAR COMPUTER STOCKED AT PRICES WELL BELOW RECOMMENDED RETAIL

GIVE US A RING ON 01-441 2922

AND SAVE £££'s WITH THE LOWEST PRICE GUARANTEE

All products carry a 1 year guarantee (parts & labour)
Pay an extra 10% for a 2 year guarantee

Shelves of Computer Books

Spares & repairs on all products, even if you didn't buy from Comp Shop

EXPRESS MAIL ORDER SERVICE

Many items over stocked on Sale Offer

New products arriving daily

'Phone your order to reserve

INSTANT CREDIT
just pay the deposit by Credit Card and take it away

SATISFYING PRICE CONCIOUS CUSTOMERS FOR NEARLY 5 YEARS

P.S. Hopeless on Software

COMP SHOP LTD

"Europes Largest Discount Personal Computer Stores"

TELEPHONE SALES
OPEN 24 hrs. 7 days a week
01-449 6596

MAIL ORDER SHOP
14 Station Road, New Barnet, Hertfordshire, EN5 1QW
(Close to New Barnet BR Station, Moorgate Line)
Telephone 01-441 2922 (Sales) 01-449 6596
Telex 298755 TELCOM G
OPEN (BARNET) 10am 7pm Monday to Saturday

BEFORE YOU BUY YOUR MICRO!

COMPUTER, PRINTER, DISC DRIVES & ACCESSORIES

ALMOST EVERY MAKE OF POPULAR COMPUTER STOCKED
AT PRICES WELL BELOW RECOMMENDED RETAIL

GIVE US A RING ON 01-441 2922

AND SAVE £££'s WITH THE LOWEST PRICE GUARANTEE

All products carry a 1 year guarantee (parts & labour)
Pay an extra 10% for a 2 year guarantee

Shelves of Computer Books

EXPRESS MAIL ORDER SERVICE

Spares & repairs on all products, even if you didn't buy from Comp Shop

Many items over stocked on Sale Offer

'Phone your order to reserve

New products arriving daily

INSTANT CREDIT
Just pay the deposit by Credit Card and take it away

SATISFYING PRICE CONSCIOUS CUSTOMERS FOR NEARLY 5 YEARS

P.S. Hopeless on Software

COMP SHOP

"Europes Largest Discount Personal Computer Stores"

TELEPHONE SALES
OPEN 24 hrs. 7 days a week
01-449 6596

MAIL ORDER SHOP
14 Station Road, New Barnet,
Hertfordshire, EN5 1QW
(Close to New Barnet BR Station,
Moorgate Line)
Telephone 01-441 2922 (Sales) 01-449 6596
Telex 298755 TELCOM G
OPEN (BARNET) 10am 7pm Monday to Saturday

MICHAEL ORWIN'S ZX81 CASSETTES

The best software (by various authors) at low prices

QUOTES

"Michael Orwin's £5 Cassette Two is very good value. It contains 10 stolid well designed games which work, offer plenty of variety and choice, and are fun."
from the ZX Software review in Your Computer, May '82 issue.

"I had your Invaders-React cassette . . . I was delighted with this first cassette."
P. Rubython, London NW10

"I have been intending to write to you for some days to say how much I enjoy the games on 'Cassette One' which you supplied me with earlier this month." *E. H. London SW4*

". . . I previously bought your Cassette One and consider it to be good value for money!"
Richard Ross-Langley, Managing Director, Mine of Information Ltd.

CASSETTE 1

(eleven 1k programs)

machine code:
React, Invaders, Phantom aliens, Maze of death, Planet lander, Bouncing letters, Bug splat.
Basic:
IChing, Mastermind, Robots, Basic Hangman.
PLUS Large screen versions of Invaders and Maze of Death, ready for when you get 16k.
Cassette 1 costs £3.80

CASSETTE 2

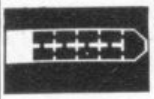
Ten games in Basic for 16k ZX81

Cassette Two contains Reversi, Awari, Laser Bases, Word Mastermind, Rectangles, Crash, Roulette, Pontoon, Penny Shoot and Gun Command.
Cassette 2 costs £5.

CASSETTE 3

8 programs for 16k ZX81

STARSHIP TROJAN



Repair your Starship before disaster strikes. Hazards include asphyxiation, radiation, escaped biological specimens and plunging into a Supernova.

STARTREK This version of the well known space adventure game features variable Klingon mobility, and graphic photo torpedo tracking.
PRINCESS OF KRAAL
An adventure game.
BATTLE Strategy game for 1 to 4 players.
KALABRIASZ World's silliest card game, full of pointless complicated rules.
CUBE Rubik Cube simulator, with lots of functions including 'Backstep'.
SECRET MESSAGES This message coding program is very txlp qexi jf.
MARTIAN CRICKET A simple but addictive game (totally unlike Earth cricket) in machine code. The speed is variable, and its top speed is very fast.
Cassette 3 costs £5.

CASSETTE 4

8 games for 16k

ZX-SCRAMBLE (machine code)

Bomb and shoot your way through the fortified caves.

GUNFIGHT (machine code)

INVADERS (machine code)

FUNGALOIDS (machine code)
GALAXY INVADERS (machine code)
Fleets of swooping and diving alien craft.
SNAKEBITE (machine code)
Eat the snake before it eats you. Variable speed (very fast at top speed)
LIFE (machine code)
A ZX81 version of the well known game.
3D TIC-TAC-TOE (Basic)
Played on a 4×4×4 board, this is a game for the brain. It is very hard to beat the computer at it. 7 of the 8 games are in machine code, because this is much faster than Basic. (Some of these games were previously available from J. Steadman).
Cassette 4 costs £5.

SPECTRUM SOFTWARE WANTED

Recorded on quality cassettes, sent by first class post, from:
Michael Orwin, 26 Brownlow Rd., Willesden, London NW10 9QL (mail order only please)

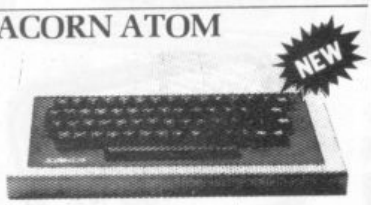
PLAY FOR TODAY

COMMODORE VIC

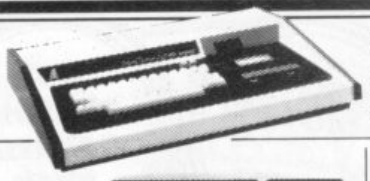
● *Colour* ● *Sound*
● *Programmable Function Keys*
● *5K Memory Expandable to 32K*
● *Standard PETBASIC* ● *Full sized Typewriter Keyboard* ● *Graphics Character Set* ● *Plug-in Program Cartridges*
● *Low Priced Peripherals*
● *Self Teaching Materials*
£189.95

VIC Compatible Cassette **£44.95**

ACORN ATOM



● *8K Rom + 4K Ram* ● *Sound*
● *20 Introductory Programs*
● *Built-in Colour*
£199.00



VIDEO GENIE I

● *Machine Language monitor*
● *Sound and Lower Case*
● *Renumber and Screen Print*
£344.00

TRS80 MODEL III

● *48 K User Ram* ● *Extended Microsoft Basic*
● *Parallel or RS232 Interfaces*
● *With 40 Track Single Density Disk Drives* **£1596.00**
● *With 80 Track Double Sided Disk Drives* **£1741.00**
● *With 80 Track Double Density Drives 1.4MB* **£1999.00**

TEAC DISK DRIVES

● *Interfaces with Video Genie, North Star Horizon, Superbrain Nascom etc.*
● *40 Track Single Disk Drive* **£259.00**
● *40 Track Double Disk Drive* **£448.00**
● *80 Track Single Disk Drive* **£344.00**
● *80 Track Double Disk Drive* **£599.00**

SHARP MZ80A

● *48K User RAM*
● *Extended Basic*
● *Integral Cassette*
£549

THE COMPUTER SHACK

Computer Shack Ltd, 14, Pittville Street, Cheltenham, Glos. Telephone: (0242) 584343

Credit available through major credit company.
Access or Barclay Card Accepted. Mailorder Enquiries Welcomed.

Prices include VAT

FOOTBALL MANAGER

Addictive Games

for
ZX81
ZX80
TRS80
VIDEO GENIE

JUST LOOK AT THESE FEATURES

★ AS MANY SEASONS AS YOU LIKE ★ 4 DIVISIONS ★
★ PROMOTION & RELEGATION ★
★ FULL LEAGUE TABLES ★
★ TRANSFER MARKET ★
★ INJURIES ★
★ 7 LEVELS OF PLAY ★
★ SAVE GAME FACILITY ★
★ MANAGERIAL RATING ★
★ PICK YOUR TEAM FOR EACH MATCH ★ F.A. CUP ★

This is NOT a mere simulation. This is an exciting and highly enjoyable game in which you play the part of a Football Manager coping with the problems and decisions involved in running your club. There are so many features it is impossible to list them here but included are form (top teams NORMALLY win), giant-killings, wage bills to pay, and you can even be sacked! It is a game requiring a great deal of skill, and people play it for literally hours on end (we have proof!).
WE GUARANTEE that this is one of the best computer games you've ever played!
BUT BEWARE, this game is extremely addictive!

FOOTBALL MANAGER *IS SUPPLIED WITH INSTRUCTIONS OCCUPIES THE ENTIRE 16K RAM*

HARDWARE REQUIRED	
ZX81/ ZX80	*TRS80/ Video Genie*
8K ROM	*LEVEL II*
16K RAM	*16K RAM*

To Order send Cheque/P.O. £7.95 made payable to: ADDICTIVE GAMES at: Dept. C.V.G. P.O. BOX 278 CONNIBURROW MILTON KEYNES MK14 7NE PLEASE STATE COMPUTER

C.P.S. GAMES

Available for Atari and ZX81.

LORD OF THE RINGS 1
This adventure takes you right through the book, the first part (there are six) covering the voyage from the Shire to Rivendell.
The tapes contain graphics. £8

DARWIN
Evolution as a game. You start as a single cell. When the environmental conditions change you will have to adapt. If you do this in the right way (and the circumstances are right) you get one step further on the evolution ladder. Ideally you should end up as man, but . . . £7

EVOLUTION OF MAN
The evolution of the human race started a long time ago. The game begins somewhere in the remote past when our ancestors were still roaming the plains. £7
DARWIN and THE EVOLUTION OF MAN are based on scientific facts and have a definite educational value.

THE GAMBLER'S PARADISE
Contains craps, chemin de fer, roulette, zanzi (a French dice game), heads and tails, guess my number, horse race and a few more. £3

THE GHOST OF RADUN
In the old, half ruined castle of Radun, a large treasure is buried.
This adventure is definitely not for the weak-hearted and we strongly advise not to play it after nightfall, especially not when you are alone in the house. £7

ADVENTURES FOR THE VERY YOUNG; THE PETER RABBIT SERIES
This new series of adventures is mainly based on graphics, but follows the traditional pattern of an adventure game.

PETER RABBIT AND THE MAGIC CARROT
Peter Rabbit goes on a quest for the magic carrot. He has to go through the big forest, meets nice friends, deals with a dwarf, gets help from old man oak, etc . . . £3.50

PETER RABBIT AND FATHER WILLOW £3.50
PETER RABBIT AND THE NAUGHTY OWL £3.50
It now transpires that the Peter Rabbit Adventures can be dangerously addictive to grown ups . . .

KING ARTHUR
Britain in the sixth century . . . THE ANGLES AND SAXONS are marauding through the Country. Leaving behind a trail of blood and devastation. How good are you at commanding troops, finding the enemy and bringing them to battle, sifting information, seeing through the fog of war, deploying your troops and many more similar skills? £7

ATARI OWNERS!
Commercial Software now available on Atari 400, Financial Modelling/Budget, Sales Day Book, Purchase Day Book, Petty Cash Book.
ASK FOR A LEAFLET

C.P.S. 14 BRITTON STREET LONDON EC1M 5NQ

SPECIAL FREE OFFER READ ON!

VIC 20

THE FIRST FULL FEATURED COLOUR COMPUTER AT **UNDER £200!!**

FEATURES
*Sound *Colour *5K Memory Expandable to 27K *Standard PET Basic *Full size typewriter Keyboard *Graphics *Plug-in memory expansion *Low-priced peripherals.

SPECIAL OFFERS AVAILABLE WHEN ORDERING YOUR VIC 20 COMPUTER
3K RAM CARD FREE
or 8K RAM CARTRIDGE £32.95 inc. VAT
or 16K RAM CARTRIDGE £54.95 incl. VAT

PLUS FREE PRESENTATION TAPE WITH EVERY CASSETTE DECK ORDERED

THE FOLLOWING ITEMS NOW AVAILABLE

VIC 20 Colour/Sound Computer	☐ £189.95 incl. VAT*
VIC Data Cassette Deck	☐ £44.95 incl. VAT
VIC 3K RAM Cartridge	☐ £29.95 incl. VAT
VIC 8 K RAM Cartridge	☐ £44.95 incl. VAT
VIC 16K RAM Cartridge	☐ £74.95 incl. VAT
VIC Joystick Control	☐ £7.50 incl. VAT
Arfon VIC Expansion Unit	☐ £97.75 incl. VAT*
Machine Code Monitor Cartridge	☐ £34.95 incl. VAT
Programmers Aid Cartridge	☐ £34.95 incl. VAT
"Avenger" ROM Games Cartridge	☐ £19.95 incl. VAT
"Super Slot" ROM Games Cartridge	☐ £19.95 incl. VAT
"Alien" ROM Games Cartridge	☐ £19.95 incl. VAT
"Super Lander" ROM Games Cartridge	☐ £19.95 incl. VAT
"Road Race" ROM Games Cartridge	☐ £19.95 incl. VAT
Introduction to Basic (Part I)	☐ £14.95 incl. VAT
Carriage & Ins. on items marked*	☐ £3.45 incl. VAT

TOTAL .....

All prices Subject to Manufacturers Price Changes

437 Stoney Stanton Road,
Coventry, CV6 5EA
West Midlands
Tel: (0203) 661162

IBEK SYSTEMS

Name: .....

Address: .....

.....

Please charge my Barclaycard/Access No.

☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

Signed: .....

Or telephone order. CVG9/82

INTEREST FREE CREDIT

* Subject to approval which can take up to 48 hours (APR = 0%)

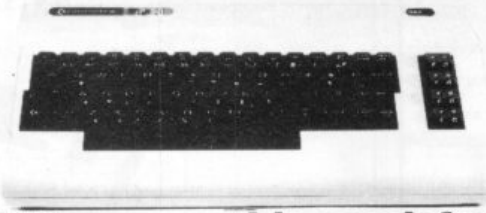
from MAPLIN

On Atari & VIC computer hardware

If your order contains over £120 worth of computer hardware apply now for interest free credit by telephoning: Mail-order: (0702) 552911
London Shop: 01-748 0926 Southend Shop: (0702) 554000 or write to P.O. Box 3, Rayleigh, Essex SS6 8LR

You pay 10% down, then 10% per month for a further nine months. (to nearest penny) Example: VIC20 Colour Computer. Cash Price £199.99.
Credit terms: £19.99 down then £20 per month for nine months: Total £199.99.
Credit quotations on request.

The VIC20 Colour Computer



could be yours this week for just
£19.99 down.
Cash price and total credit price £199.99.
Order as AF47B

VIC 20 ACCESSORIES:

C2N Cassette Unit (AF48C) £44.95

VIC20 Printer: (AF49D) £230.00
80 characters per line, 30 characters per second, tractor feed, full alphanumerics and graphics, double size character.

VIC20 Disk Drive: (AF50E) £396.00
170K storage on standard single-density, single-sided, soft-sectored floppy disks.

Add-on RAM Cartridges:

3K RAM	(AF51F)	£29.95
8K RAM	(AF52G)	£44.95
16K RAM	(AF53H)	£74.95

Memory Expansion Board:
6 ports for plug-in cartridges
(AF54J) £125.95

Introduction to BASIC Cassettes

Part 1	(AC57M)	£14.95
Part 2	(AC58N)	£14.95

Joysticks and Paddles:

Single Joystick	(AC53H)	£7.50
Pair of Joysticks	(AC37S)	£13.95
Le Stick	(AC45Y)	£24.95
Pair of Paddles	(AC30H)	£13.95

Programming Aid Cartridges

Super Expander: 3K RAM and Hi-res graphics (AC54J) £34.95

Programming Aid: Additional commands, function Key programming etc. (AC55K) £34.95

Machine Code Monitor (AC56L) £34.95

Game Programs

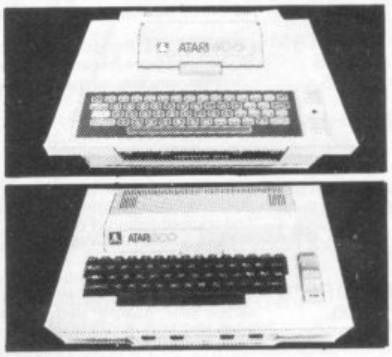
Avenger Cartridge	(AC59P)	£19.95
Star Battle Cartridge	(AC60Q)	£19.95
Super Slot Cartridge	(AC61R)	£19.95
Jelly Monsters Cartridge	(AC62S)	£19.95
Alien Cartridge	(AC63T)	£19.95
Super Lander Cartridge	(AC64U)	£19.95
Road Race Cartridge	(AC65V)	£19.95
Rat Race Cartridge	(AC66W)	£19.95
Blitz Cassette	(AC67X)	£4.99

Books About VIC

Learn Programming on the VIC	(WA31J)	£2.50
VIC Revealed	(WA32K)	£11.50
VIC Programmers Reference Guide	(WA33L)	£16.50

4 Consoles available:

Atari 400 with 16K RAM	**(AF36P)**	**£249.95**
Atari 400 with 48K RAM	**(AF37S)**	**£319.00**
Atari 800 with 16K RAM	**(AF02C)**	**£499.00**
Atari 800 with 48K RAM	**(AF55K)**	**£590.00**



Lots of other hardware:

Cassette Recorder	(AF28F)	£50.00	16K RAM Module	(AF08J)	£55.00
Disk Drive	(AF06G)	£299.95	48K RAM Module	(AF44X)	£125.35
Thermal Printer	(AF04E)	£265.00	48K Upgrade for 400	(AF45Y)	£75.00
Printer Interface for 400	(AF41U)	£59.95	Floppy Disk	(YX87U)	£2.50
Printer Interface for 800	(AF42V)	£59.95	Le Stick	(AC45Y)	£24.95
Interface Module	(AF29G)	£135.00	Joystick Controllers	(AC37S)	£13.95
Versawriter	(AF43W)	£169.00	For full details ask for our hardware leaflet (XH54J) SAE appreciated		

NOW YOU CAN JOIN THE U.K. ATARI COMPUTER OWNER's CLUB. An independent user's group.
Four issues of the club magazine for only £1.60! Address your subscription to Ron

THE CHOICEST GEMS OF ATARI SOFTWARE FROM MAPLIN

Adventure Games

Star Warrior	C-32K-(BQ24B)	£28.95
Rescue At Rigel	C-32K-(BQ21X)	£22.45
Invasion Orion	C-32K-(BQ23A)	£18.95
Datestories of Ryn	C-32K-(BQ22Y)	£14.95
Galactic Empire	C-24K-(BQ14Q)	£14.95
Hi-Res Adventure ? / ?	D-48K-(BQ25C)	£24.95
Analog Adventure	D-32K-(BQ33L)	£16.95
Adventure Land	C-24K-(BQ00A)	£14.95
Pirates Adventure	C-24K-(BQ01B)	£14.95
Mission Impossible	C-24K-(BQ02C)	£14.95
Voodoo Castle	C-24K-(BQ03D)	£14.95
The Count	C-24K-(BQ04E)	£14.95
Strange Odyssey	C-24K-(BQ05F)	£14.95
Mystery Fun House	C-24K-(BQ06G)	£14.95
Pyramid of Doom	C-24K-(BQ07H)	£14.95
Ghost Town	C-24K-(BQ08J)	£14.95
Savage Island I	C-24K-(BQ09K)	£14.95
Savage Island II	C-24K-(BQ10L)	£14.95
Golden Voyage	C-24K-(BQ11M)	£14.95
Energy Czar	C-16K-(YG53H)	£9.95
Kingdom	C-8K-(YG55K)	£9.95

Teach-Yourself Programs

Conversational French	5C-16K-(YG44X)	£39.95
Conversational German	5C-16K-(YG45Y)	£39.95
Conversational Spanish	5C-16K-(YG46A)	£39.95
Conversational Italian	5C-16K-(YG47B)	£39.95
Touch Typing	2C-16K-(YG49D)	£15.95
States & Capitals	C-24K-(YG56L)	£9.95
European Countries & Capitals	C-16K-(YG57M)	£9.95

Learn Programming

Invitation to Programming	C-8K-(YG43W)	£15.95
Basics of Animation	C-32K-(BQ57M)	£11.95
Basics of Animation	D-32K-(BQ58N)	£11.95
Player Missile Graphics	C-16K-(BQ59P)	£18.95
Player Missile Graphics	D-24K-(BQ60Q)	£18.95
Display Lists	C-16K-(BQ51F)	£11.95
Display Lists	D-24K-(BQ52G)	£11.95
Horiz/Vertical Scroll	C-16K-(BQ53H)	£11.95
Horiz/Vertical Scroll	D-24K-(BQ54J)	£11.95
Page Flipping	C-16K-(BQ55K)	£11.95
Page Flipping	D-24K-(BQ56L)	£11.95
Master Memory Map	Book-(XH57M)	£4.00

Business Programs

Visicalc	D-32K-(YL39N)	£119.95
Word Processor	D-32K-(YG42V)	£99.95
Calculator	D-24K-(YG50E)	£16.95
Graph—H	C-16K-(YG51F)	£13.95
Statistics	C-16K-(YG52G)	£13.95

Arcade Games

Star Raiders	E-8K-(YG66W)	£29.95
Asteroids	E-8K-(YG60Q)	£29.95
Space Invaders	E-8K-(YG70M)	£29.95
Missile Command	E-8K-(YG64U)	£29.95
Super Breakout	E-8K-(YG67X)	£24.50
Tari Trek	C-24K-(YL36P)	£8.95
Tari Trek	D-32K-(YL37S)	£11.95
Star Trek 3.5	C-32K-(BQ15R)	£14.95
Race In Space	C-16K-(BQ35Q)	£14.95
Shooting Gallery	C-16K-(BQ36P)	£14.95
Mountain Shoot	C-16K-(BQ12N)	£10.95
Jawbreaker	D-48K-(BQ26D)	£20.64
Basketball	E-8K-(YG61R)	£24.50
Tank Trap	C-16K-(YL34M)	£9.95
Tank Trap	D-32K-(YL35Q)	£12.95

Home Game Programs

Scram	C-16/24K-(YG58N)	£17.50
Cypher Bowl	C-32K-(BQ20W)	£29.50
Thunder Island	C-16K-(BQ37S)	£10.95
Rotating Tilt	C-16K-(BQ48C)	£14.95
Lunar Lander	C-16K-(BQ16S)	£10.95
Sunday Golf	C-16K-(BQ13P)	£10.95
Darts	C-16K-(BQ42V)	£19.95
Tournament Pool	C-16K-(BQ45Y)	£19.95
Snooker & Billiards	C-16K-(BQ44X)	£19.95
Chess	E-8K-(YG63T)	£24.50
Cribbage & Dominoes	C-16K-(BQ43W)	£14.95
Poker Solitaire	C-16K-(BQ17T)	£10.95
Blackjack	C-8K-(YG62S)	£9.95
Fast Gammon	C-8K-(YL33L)	£16.95
Reversi (Othello-type)	C-16K-(BQ19V)	£14.95
Gomoko	C-16K-(BQ18U)	£14.95
Hangman	C-8K-(YG54J)	£9.95
Humpty Dumpty & Jack & Jill	C-16K-(BQ38R)	£19.95
Hickory Dickory Dock	C-16K-(BQ39N)	£19.95
British Heritage Jig-Saw Puzzles	C-16K-(BQ40T)	£19.95
European Scene Jig-Saw Puzzles	C-16K-(BQ41U)	£19.95
Atari Safari (25 Programs)	C-16K-(BQ49D)	£18.95
Atari Safari (25 Programs)	D-16K-(BQ50E)	£24.95
Mind Bogglers (3 Programs)	C-16K-(YL38R)	£11.95

Utilities

3D-Super Graphics	D-48K-(BQ28F)	£29.95
3D-Super Graphics	C-48K-(BQ29G)	£29.95
Atari World (Graphics)	D-48K-(BQ27E)	£43.95
Assembler Editor	E-8K-(YG68Y)	£39.95
Assembler	C-16K-(YL32K)	£19.95
6502 Disassembler	C-8K-(YL30H)	£9.95
6502 Disassembler	D-8K-(YL31J)	£12.95
Character Generator	C-16K-(YL27E)	£9.97
Character Generator	D-16K-(YL28F)	£12.50
Telelink	E-8K-(YG59P)	£21.50

Music Programs

Music Composer	E-8K-(YG48C)	£35.95
Movie Themes (use with Music Composer)	C-16K-(BQ34M)	£9.95

Computer Languages

Operating System A+	D-48K-(BQ30H)	£49.95
QS Forth	D-24K-(YL29G)	£49.95
Pilot (Consumer)	E-8K-(YG69A)	£54.00
Basic A+	D-48K-(BQ31J)	£49.95
Basic A+ & Operating System A+	D-48K-(BQ32K)	£99.50

Key C = Cassette D = Disk E = Cartridge
2C = 2 Cassettes etc 8K 16K etc shows minimum memory requirement

Send sae now for our new software leaflet with details of all the above programs. Order As XH52G — Issue 2.

Subscribe now to America's leading Atari-only magazine — Analog — 6 issues per year for just £9.00. Order as GG24B.

New titles this month

Learn Programming:

Invitation to Programming 2	C-16K-(BQ67X)	£22.95
Invitation to Programming 3	C-16K-(BQ68Y)	£22.95

Business Programs:

Personal Financial Management	D-32K-(BQ65V)	£49.00
Mortgage and Loan	C-16K-(BQ66W)	£13.95

Arcade Games:

Caverns of Mars	D-32K-(BQ69A)	£24.50
Centipede	E-16K-(BQ70M)	£29.95
Pac-Man	E-16K-(BQ71N)	£29.95
K-Razy Shoot Out	E-16K-(BQ63T)	£29.95
Mous kattack	D-32K-(BQ77J)	£22.95
Ghost Hunter	C-16K-(BQ64U)	£24.50
Galactic Chase	D-32K-(BQ61R)	£19.95
Galactic Chase	C-16K-(BQ62S)	£16.95

Home Programs:

Video Easel	E-16K-(BQ72P)	£24.50

Computer Languages:

Microsoft Basic	D-32K-(BQ74R)	£59.95
Pilot (Educator)	E&2C-16K-(BQ75S)	£79.95

Utilities:

Macro Assembler	D-32K-(BQ73Q)	£59.95
K-DOS (Superior disk operating system)	D-32K-(BQ76H)	£53.95

MAPLIN

Maplin Electronic Supplies Ltd
P.O. Box 3, Rayleigh, Essex.
Tel: Southend (0702)
552911/554155.

Demonstrations
at our shops NOW
See Atari and Vic in action at
159-161 King St., Hammersmith W6
Tel: 01-748 0926
or at 284 London Road, Westcliff-on-Sea, Essex.
Tel: (0702) 554000
Lynton Square, Perry Barr,
Birmingham:
Tel. (021) 356 7292

Note: Order codes shown in brackets. Prices correct at time of going to press. (Errors excluded)

ARTIC moving ahead with ZX software

ZX CHESS & ADVENTURES

PROGRAMS FOR THE ZX81/80 INCLUDING –

NEW **ZX FORTH £35.00** — Full implementation of FORTH on ZX, No longer held up by the slow BASIC – FORTH runs 10-26 times faster than BASIC. "Simplicity of BASIC with speed of Machine Code"

NEW **16K BYTE RAM PACKS £31.95** — 'BYG BYTE' Ram pack, no Wobble problems, 1 year guarantee on each Ram Pack. Simply the best you can buy. Immediate Delivery.

NEW **1K ZX CHESS!! £2.95** — We didn't think it was possible but this game plays against you. Two opening moves, needs 1K of RAM to run. Incredible.

ADVENTURES ADVENTURE 'A' £6.00 — Exciting machine code games with instant response, choose from the range below. You find yourself stranded on an alien planet. Can you reach your ship and escape?

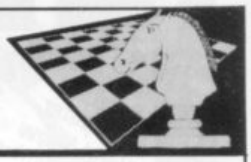
ADVENTURE 'B' £7.00 — In a jungle clearing you come across an Inca temple. You must break in, collect treasure and escape alive. Beware. Includes a cassette save routine.

ADVENTURE 'C' £8.00 — You are unfortunate enough to be drawn to an alien cruiser. Can you reach the control room and free yourself or will they get you first? Includes a cassette save routine.

GALAXIANS £3.95
All the features of the arcade game in a fast machine code program. Swooping attackers, explosions and personalised scoring.

ZXBUG £7.00
A 30 in 1 machine code tool and disassembler, allows access to registers and search through and modify memory; with cassette routines.

ZXCHESS



TWO GREAT ZX81 16K CHESS GAMES

ZXCHESS (ENHANCED)

- Written totally in machine code.
- Full graphic display of Chess board.
- Six levels of play: Two play within competition time limits.
- Option to play Black or White.
- Plays all legal moves including castling and en-passant.
- Cassette routines for saving unfinished game and returning to later.
- Displays moves of game on screen or printer for analysis.
- Print a copy of the Chess board onto the printer.
- Board can be set up in any position, you can even swap sides midgame.
- Clear whole board with one command: for end game analysis.

£6.50

ZXCHESS II We believe the strongest ZX81 Chess game as no other has beaten it!!

- All the features of ZXCHESS plus:
- Book of 32 opening moves.
- Seven levels of difficulty: FOUR play within competition time limits.
- A move is suggested by the ZX81 if wanted.
- Optional Full Graphic version using the QS CHRS Board.

£9.95

2 copies supplied on cassette with full instructions.
Cheques and postal orders payable to:

ARTIC COMPUTING "Dept C.V."
396 JAMES RECKITT AVENUE,
HULL HU8 0JA

GAMES CENTRE

The Largest Selection of Games in the World **including**

VIDEO GAMES

22 OXFORD STREET · LONDON W.1.
(near Tottenham Court Road)
and also at
439 OXFORD ST. W.1.
(opposite Selfridges)
126 CHARING CROSS ROAD, W.C.2
(opposite Foyles)
184 REGENT STREET, LONDON W.1.
(2 mins from Oxford Circus)

SOUND with ZX-81!

MAKE AMAZING SOUND EFFECTS WITH YOUR ZX-81

£25.95 THE ZON X-81
incl p&p & V.A.T.

- The ZON X-81 SOUND UNIT is completely self-contained and especially designed for use with the ZX-81. It just plugs in – no dismantling or soldering.
- No power pack, batteries, leads or other extras.
- Manual Volume Control on panel – ample volume from built-in loudspeaker.
- Standard ZX-81 – 16K Rampack or printer can be plugged into ZON X-81 Sound Unit without affecting normal ZX-81 operation.
- Huge range of possible sounds for games or: Music, Helicopters, Sci-Fi, Space Invaders, Explosions, Gun-shots, Drums, Planes, Lasers, Organs, Bells, Tunes, Chords etc., or whatever you devise!
- Uses 3-channel sound chip giving programme control of pitch, volume of tones and noise, all with envelope control.
- Easily added to existing games or programmes using a few simple "BASIC" lines.

FULL instructions with many examples of how to obtain effects and the programmes, supplied. Fully Guaranteed.

BI-PAK Dept CG9 P.O. Box 6, 63A High Street, Ware, Herts.
Access & VISA accepted
Ring 0920 3182 for immediate despatch.

MAGNETIC MEDIA

14-20 GEORGE STREET, BALSALL HEATH, BIRMINGHAM B12 9RG.
Tel: 021-440 8338

FOR TRS 80 OWNERS

AS AN INTRODUCTORY OFFER MAGNETIC MEDIA CO. ARE OFFERING THESE WELL KNOWN PROGRAMS AT RIDICULOUSLY LOW PRICES. IF THIS SEEMS AN ATTEMPT TO GAIN GOOD WILL WHILE LAUNCHING OUR COMPANY INTO THE SOFTWARE BUSINESS, SO BE IT. BUT THE PRICES MUST BE TEMPTING, AND IT WILL BE OUR POLICY TO KEEP THEM SO.

OTHER MACHINE OWNERS DON'T DESPAIR YOUR TURN WILL COME VERY SOON.

SPECIAL PACKS

	Individual Price		Pack Price	
	Cass	Disc	Cass	Disc
BIG FIVE				
Stellar Escort	£6.95	£7.95		
Super Nova	£6.95	£7.95		
Attack Force	£6.95	£7.95	£27.00	£29.00
Meteor Mission 2	£6.95	£7.95		
Robot Attack	£6.95	£7.95		
WAR GAMES				
Tigers in the Snow	£9.95	£10.95	£13.75	£15.00
The Battle of Shilloh	£10.75	£11.75		
SPACE GAMES				
Star Flight (Star Trek 3.5)	£12.00	£13.00		
Zossed in Space	£9.50	£10.50	£30.00	£32.00
Lunar Lander	£9.50	£10.50		
Eliminator	£10.75	£11.75		
ADVENTURE GAMES				
Escape from Traam		£10.50		£18.00
Stone of Sisyphus		£12.30		
INDIVIDUAL GAMES				
Olympic Decathlon	£13.75	£17.50		
Battle Trek	£12.00	£13.00		
Galactic Triology	£25.00	£27.00		
Flight Simulator	£11.95	£12.95		

ALL PRICES INCLUDE VAT/P&P

NAME .....

ADDRESS .....

.....

PLEASE SEND ME:

PACKS ..... at £ .....

.....

GAMES .....

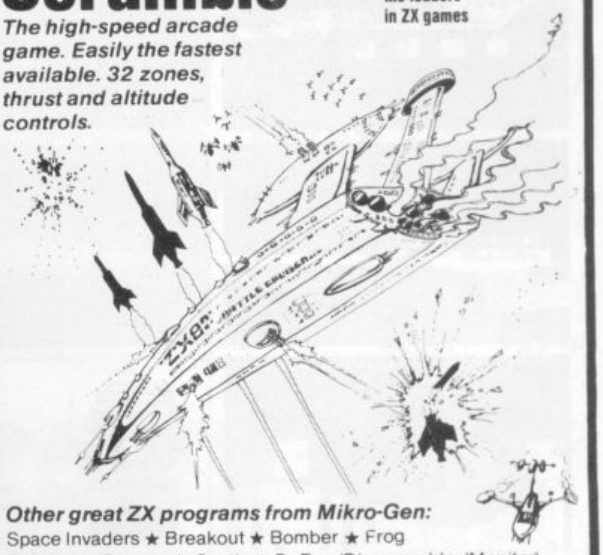
..... at £ .....

I ENCLOSE PAYMENT FOR £.....

Scramble

from MIKRO-GEN the leaders in ZX games

The high-speed arcade game. Easily the fastest available. 32 zones, thrust and altitude controls.



Other great ZX programs from Mikro-Gen:
Space Invaders ★ Breakout ★ Bomber ★ Frog
Paxman ★ Sorcerer's Castle ★ DeBug (Disassembler/Monitor)

All on cassette, with library case **ONLY £3.95 EACH**

Write for full details of the Mikro-Gen range of programs and add-ons, available from local stockists or direct from the manufacturers (please make cheques/PO's payable to Mikro-Gen and add 40p post & packing)

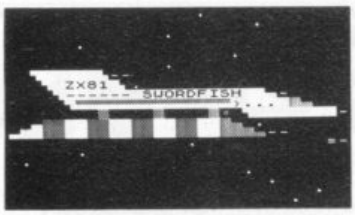
Suppliers of Software to Sinclair

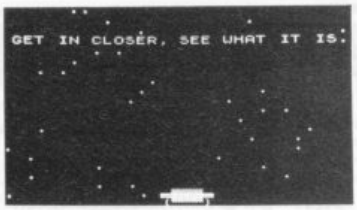
MIKRO-GEN

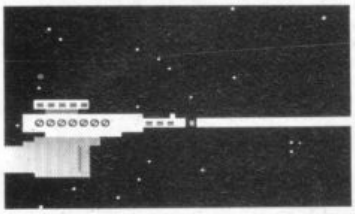
24 Agar Crescent Bracknell Berks RG12 2BK Tel: Bracknell (0344) 27317

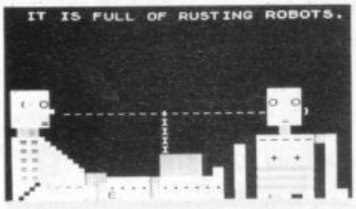
AD INDEX

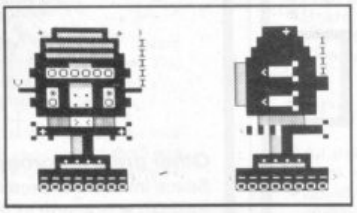
Acornsoft	77
Addictive Games	93
Akhter Instruments	74
Altwasser, Richard	87
Anglo American Software Co	20
Artic Computing	96
Atari	24
Audio Computers	2
Audiogenic	11
Audio Video Offers	77
BEC Computerworld	87
Bi-Pak	96
Bug Byte	10
Calisto Computers	34
Chromasonic Electronics	8
Commodore Computing	48
Computershack	92
CPS Games	93
DK'tronics	76
Dragon Data	30/31
East London Robotics	16
English Software	45
Fuller Microsystems	52
Furlong Products, Peter	87
Gala Set	68
The Gamer	52
Games Centre	96
Gemini Electronics	45
Gemini Marketing	98
Greye, J K	16
Ibek Systems	93
Kansas City Systems	68
Kayde Electronic Systems	99
JRS Software	77
Landau Electronics	75
Llamasoft Software	56
Lowe Electronics	80
Magnetic Media	97
Maplin	94/95
Molimerx	4
Orwin, M	92
Pixel Productions	98
Program Power	26
Quicksilva	72
Shiva Publishing	56
Silica Shop	67
Silicon Chip	6
Sinclair Research	58/59/86
Spectrum	14/15
SRS Microsystems	16
Zynar	OBC

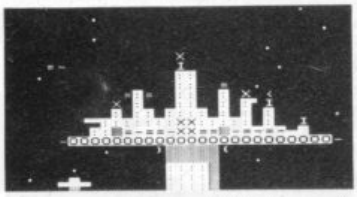


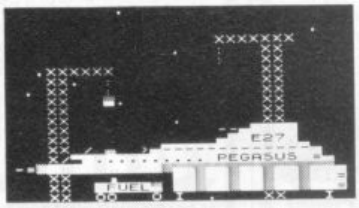












VIC 20 16K ZX81

SUBSPACE STRIKER . . . It comes from out of nowhere and then vanishes back into the ether. With your deadly Antimat torpedoes, you unleash havoc in the federation spacelanes.

ZOR . . . Two mighty robots are designed for one purpose — to fight to the death. In the style of a mediaeval duel, you must do battle with the Champion of Zor to save your planet.

ENCOUNTER . . . Would you know what to do if you encountered extra-terrestial beings. In this exciting game, you are abducted by aliens and the space invaders play YOU!

STARQUEST . . . A voyage of discovery and adventure in the cosmos. With the help of your onboard computer, you seek a habitable planet amidst the perils of deep space.

TRADER . . . A trilogy of three full 16K programmes that combine to give a fantastic 48K graphic adventure. As a galactic trader you seek your fortune and deal with some very bizarre customers indeed.

Packed into 16k with full screen animated graphics, Pixel software makes a delightful change. 16k games are £9.50 for VIC 20 and £5.50 for ZX81. Trader is £18.50 for VIC 20 and £10.50 for ZX81. Ask your dealer today or write to us direct for fast service.

PIXEL

Pixel Productions 39 Ripley Gdns. London SW14 8HF

SHARP MZ-80K/MZ-80A/MZ-80B, TI994A TRS 80, VIDEO GENIE, BBC, VIC20 (16K), ATARI, CASSETTE BUSINESS SOFTWARE by Dale Hubbard

All programs cassette based. All are menu operated and completely 'user friendly'. Each complete with demonstration file where appropriate and explanatory manual outlining the facilities and how the program works.

DATABASE
A complete electronic filing cabinet/card index system. Use as you would a catalogue or Kardex. Operations include sort, search, list, delete, total, line print, add record, change record etc. So many applications in business use, i.e. employee data, suppliers file, customer file, telephone directory, price lists etc. etc. Complete with demo file and bound manual. **£19.95**

INVENTORY CONTROL SYSTEM
All the necessary for keeping a rigidly accurate stock control. Extensive facilities include automatic stock number allocation with user-allocated reference number if required, quick stock summary, full stock summary, stock cost price, stock sell price, minimum stock level, re-order quantity, supplier, supplier telephone no., financial reporting, including overall gross profit margin, cost of new purchases, total of stock at cost and sell etc. etc. Complete with demo file and bound manual. **£19.95**

MAILING LIST
The ultimate mailing list program with facilities to store details on file and print or screen information selectively by user defined codes, in user defined format to suit printer and paper/labels. All the usual routines and more, including sort, search, delete, add, change etc. etc. Complete with demo file and bound manual. **£19.95**

INVOICES/STATEMENTS
Now you can produce crisp, clean and accurate company invoices and statements with your computer and printer. This one is very adaptable in terms of formatting and allows you to design your own form set-up to suit you. Naturally all calculations are automatic and all aspects of VAT are catered for as well as credit and settlement terms messages and other user defined messages. May also be used for credit notes, has inbuilt file for customers name and address details on cassette to save laborious typing each time. A must for your business. **£19.95**

SPECIAL OFFER all 5 for £79.95 inc. VAT & p&p.
SPECIAL OFFER MZ-80A computer with all programs £500 + VAT.

ACCOUNTS
A gem of a program, all cassette based, with the following features:

Daily Journal	Sales Ledger
Credit Sales	Purchaser Ledger
Cash Sales	Bank Account
Credit Purchases	Year to Date Summary
Purchases – other	

A fully interactive program suitable for all businesses. Files can be saved and loaded and totals from one file carried forward to another on cassette. Particularly useful from a cash flow point of view, with an immediate accessibility to totals for debtors and creditors. Bank totally supported with entries for cheque numbers, credits and, of course, running balance. Complete with demo file and bound manual. **£19.95**

Access | Welcome
Please state machine type when ordering.
Send cheque, registered cash, PO or Access Number to:

GEMINI MARKETING LTD
9, Salterton Road,
Exmouth,
Devon EX8 2BR
Tel: (03952) 5832

Phone us with your Access order for immediate despatch!

KAYDE Electronic Systems Ltd

ZX KEYBOARDS FULLY CASED

ZX81 WITH REPEAT KEY

This is a highly professional keyboard using executive buttons as found on top quality computers. It has a repeat key and comes complete in its own luxury case. This is a genuine professional keyboard and should not be confused with toy keyboards currently available on the market.

£37.95

As reviewed by Tim Hartnel ZX Computing/Interface

NEW

SPECTRUM

This is a highly professional keyboard, taken from our World Famous and well proven 81 keyboard, it has been redesigned to complement your ZX Spectrum.
BUY NOW BEFORE THE RUSH **£37.95**

FULLY CASED ZX81

NEW Spectrum

RAMPACKS

MASSIVE ADD ON MEMORY

MEMORIES YOU CAN RELY ON

64K	**£72.95**
16K	**£29.95**

Up grade your Spectrum now to 48K. Just add our 32K memory extension plug in board to your Spectrum which already has 16K to give you a massive 48K of memory.

£48.95

ZX81 4K GRAPHICS BOARD

The *KAYDE* Graphics Board is probably our best accessory yet. It fits neatly inside your ZX81. It comes complete with a pre-programmed 4K Graphics ROM. This will give nearly 450 extra graphics and with the inverse makes a total of nearly nine hundred.

The *KAYDE* Graphics Board has facilities for either 2K of RAM (for user definable graphics) 4K of ROM or our 4K Tool Kit Chips that will be available shortly. All the graphics are completely software controlled therefore they can be written into your programmes. Here are a few examples:

A full set of space invaders — Puckman — Bullets, Bombs — Tanks — Laser Bases and Alien Ships

NO EXTRA POWER NEEDED **£29.95**

FLEXIBLE RIBBON CONNECTOR

Stops movement of RAM PACK	**£12.95**
IN/OUT PORT	**£10.95**
MOTHER BOARD	
Complete with 5 volt regulator	**£18.95**

16K GRAPHICS BOARD SOFTWARE

PECKMAN The only true ZX version of the popular arcade game.
SPACE INVADERS The best version available anywhere.
CENTIPEDE "In all I think this is the best presented moving graphic programme I've yet seen" — Phil Garratt, INTERFACE **£5.95 EACH**

Graphic Software can only be used with a Graphics board

All Hardware comes fully built and tested and complete with a 14 day money back option

Qty	Item	Item price £	Total £
	ZX Spectrum Cased Keyboard s	37.95	
	ZX Spectrum 32K Rampack	48.95	
	ZX81 Cased Keyboard with repeat key	37.95	
	ZX81 64K Rampack	72.95	
	ZX81 16K Rampack	29.95	
	ZX81 4K Graphics Board	29.95	
	ZX81 Flexible Ribbon Connector	12.95	
	ZX81 Mother Board	18.95	
	ZX81 In out port	18.95	
	ZX81 16K Graphic Software	5.95	
	ZX81 16K Software	5.95	
	Vic 20 Software	7.95	
	Name of Software	+p&p	

*I enclose a cheque postal order payable to *KAYDE Electronic Systems Ltd.*, for £.....

*Please charge to my Access Barclaycard Trustcard account no.

*Please delete complete as applicable.

Please print.

Signature _____

Name: Mr/Mrs/Miss

Address

Please allow £1.50 P&P for all Hardware 50p for all software (Dept C.V.G.)

16K 81 SOFTWARE

CENTIPEDE "In all, I think this is the best presented moving graphic programme I've yet seen" Phil Garratt — Interface.
3D/3D LABYRINTH A cubit maze that has corridors which may go left, right, up and down. **£5.95**

4K Tool Kit full of utilities to aid the programmer in constructing and de-bugging E. PROM version for use with graphics ROM. **£9.95**

VIC-20 SOFTWARE

NEW

THE KAYDE VALLEY — **The ultimate in adventure games**

Othello Plus many more.

£7.95

VIC 20 dealer

Access

SEND FOR A FREE CATALOGUE STATING TYPE OF COMPUTER.
WHY WAIT TO PAY MORE FAST IMMEDIATE DELIVERY

VISA

Post To Dept **KAYDE ELECTRONIC SYSTEMS LTD**
THE CONGE, GREAT YARMOUTH
NORFOLK NR30 1PJ
Tel: 0493 57867 (Dept. C.V.G.)
Telex: 957 247 CHATCOM G

Don't forget you can always order on the telephone with your credit card *Dealers welcome*

LEISURE CENTRES FOR BRAINS

Announcing a new range of Electronic Entertainment from one of today's most advanced computer companies.

1

In HADRON, there are over a dozen enemies from five different classes
Many of the objects actually rotate as you approach them, creating astonishing 3-D effects **£19·95**

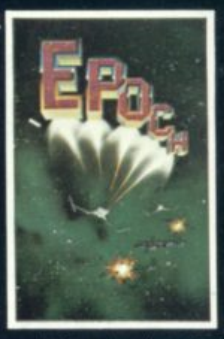
2

You set out to secure the secrets of the imprisoned Professor Eisenstadt.
The in-depth plot, extensive vocabulary and colorful graphics make Kabul Spy a most intriguing adventure game. **£19·95**

3

Take Theseus' place in the labryrinth and you will travel through 16 different three-dimensional mazes. Armed with a laser sword, you will encounter a myriad of fanciful and frightful creatures. **£19·95**

4



You are the last survivor of your starship crew on a suicide mission.
Your one-man Space Cruiser has only one weapon — a limited quantity of very powerful atomic missiles. **£19·95** *

5

Was the Spider able to destroy the Fly-Fighters, elude the B.S. and repair the damaged web??? Fly back in time with us and join the Alliance. See how well you do as the Spider-Fighter.
£17·95

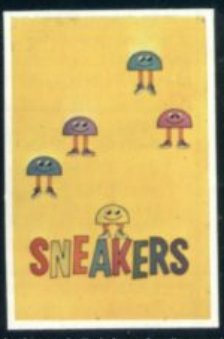
6

"There are ten rooms full of chambers and passages and they are all protected by this Drageroo that Grud created.
It has wings and heat sensors and it can't be shot! **£17·95**

7

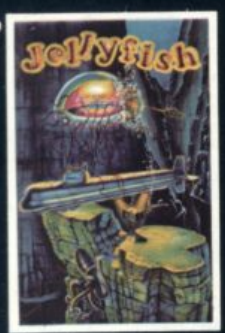
Enemy forces are advancing from all directions and begin to place Killer satellites in orbit around your station.
And then, look out for the meteors! **£17·95**

8



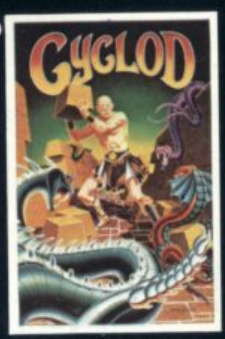
Sneaker's popularity is based on its seemingly endless variety of challenges.
The game features some of the most animated and colorful characters to ever attempt to stomp you into submission. **£17·95**

9



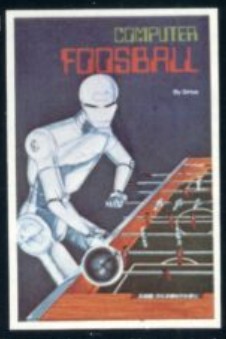
"As if it wasn't dangerous enough battling the Russians, now it's the Jellyfish too! We shot them, but they break into smaller pieces and keep coming.
They've got to be nuclear mutants!" **£17·95**

10



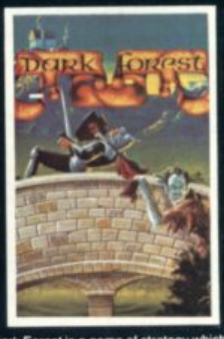
Cy·clod (sīklād) ***n.*** A mythical creature apparent in many legends:
in Sirius legend, the video representation of a game wherein an eyeball fights snakes with bricks. **£17·95**

11



You say you have a sudden urge to play Foosball? Now, you and up to three of your friends can play Foosball at home.
Divide into Grud and Robot teams and bash the ball around the screen. **£17·95** *

12



Dark Forest is a game of strategy which pits you against Trolls, Magicians, Sea Serpents, Specters, Gruds and up to five other players.
You can choose from any of eight levels of difficulty. **£17·95**

1	2	3	4	5	6	7
8	9	10	11	12	13	

BARCLAYCARD VISA

Please tick appropriate boxes.

To: The Leisure Collection, P.O. Box 6, Uxbridge, Middlesex, UB8 1JQ.

I enclose a cheque/postal order for £_____ or please debit my Access/Barclaycard Account Number _____
(All prices include P. & P. and V.A.T.)

Signature _____

Name _____

Address _____

_____

To order by phone, ring (0895) 59836 and quote your credit card no.

THE LEISURE COLLECTION

A division of Zynar Ltd.,
122, High Street, Uxbridge, Middlesex, UB8 1JT.

All games require Apple][with 48K and one Apple disk drive.
Games marked * require games paddle.

13

While you try to make your bombing run, you have to avoid being hit by anti-aircraft fire and fight off enemy aircraft as well. **£17·95**